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FY 2023 Annual Report on Cost Assessment Activities



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FY 2023 Annual Report on Cost Assessment Activities



**Director, Cost Assessment and
Program Evaluation**

May 2024

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FOREWORD

In an environment of growing threats, competing priorities, and fiscal pressures, the Department of Defense (DoD) must spend its resources on the right things, in the right amounts, at the right time. The DoD cost analysis community, consisting of approximately 2,000 government analysts, plays a critical role in supporting DoD's budget of roughly \$825 billion by preparing cost estimates and analyses to inform resource allocation, acquisition, and requirements generation processes for future capabilities for more than 300 major weapon systems and information systems. Additionally, analysts working in service cost organizations support their parent acquisition authorities for countless smaller acquisition programs.

The Director of Cost Assessment and Program Evaluation (DCAPE) is the Principal Staff Assistant and advisor to the Secretary of Defense and other senior officials in DoD for cost assessment, program evaluation, and analysis. The DCAPE position was established by the Weapon Systems Acquisition Reform Act of 2009 (WSARA), milestone legislation that aimed to put acquisition programs on sound footing from the outset to avoid major schedule delays and cost overruns. To meet this mandate, DCAPE is the principal official for independent cost estimation and analysis, ensuring that DoD is provided accurate information and realistic cost estimates for its acquisition programs.

Toward that end, CAPE has several responsibilities as it prepares or reviews independent cost estimates and analyses covering the life cycle of major defense and other acquisition programs. These activities support acquisition milestone reviews, congressional certifications, sustainment reviews, and budget requests. CAPE is also responsible for prescribing policies and procedures for estimating costs, performing cost analyses, and collecting cost data within DoD. CAPE publishes and continually updates instructions, manuals, and guides that provide cost guidance, methods, and tools for DoD-wide use to improve cost awareness and transparency. These resources provide the foundation for accurate and realistic cost estimates for DoD acquisition programs throughout the cost community.

CAPE leads the development of improved analytic skills and competencies within the DoD cost analysis workforce through formal training and continuing education. CAPE's efforts include redesigning the Defense Acquisition University's curriculum for professional certification in cost estimating and supporting graduate education in cost estimating and analysis at the Naval Postgraduate School and the Air Force Institute of Technology. CAPE also provides virtual training and office hour support on cost analysis tools and databases. Hundreds of government and industry professionals take advantage of these opportunities each year, ensuring continued education and training to improve cost estimating.

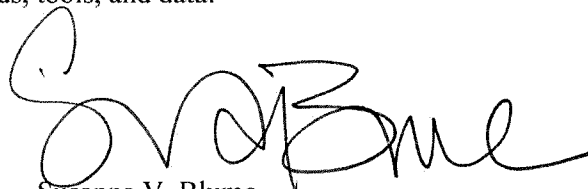
For more than a decade, the cost analysis community has invested in the Cost Assessment Data Enterprise (CADE), one of the most robust data repositories in DoD. CADE has over 3,000 government and industry users and contains terabytes of data on approximately 700 weapon system programs, 4,000 prime contracts, 2,000 subcontracts, and over 40,000 cost and software data reports. CADE collects actual cost information provided directly from internal contractor business systems in modern data formats, curates the data for use in cost estimates, and stores the data for the entire DoD cost community. CADE also serves as a virtual library for the cost analysis community, providing access to numerous documents, reports, and briefings pertaining to cost analysis and defense acquisition programs.

The cost analysis community now seeks to extend this success by developing the Enterprise Visibility and Management of Operating and Support Cost (EVAMOSOC) system, a network-based, enterprise-level data system for operating and support (O&S) cost information. This system is already improving DoD's ability to track and evaluate O&S costs, which constitute the majority of a system's life-cycle cost for most weapon systems. The initial EVAMOSOC development addressed the largest known deficiencies in the completeness of the current O&S cost data systems. As a groundbreaking result, EVAMOSOC now provides data for military manpower and maintenance costs for Army weapon systems and Marine Corps ground systems. EVAMOSOC data now supports a wide range of DoD organizations and their extensive activities, such as O&S cost estimates, readiness analyses, programming and budget validation, and DoD audits.

As a result of these efforts since the enactment of WSARA, CAPE—in partnership with the military departments' cost organizations—has made considerable progress in improving the quality and accuracy of life-cycle cost estimates for acquisition programs. These improvements have contributed to a steep measurable decline in cost growth for major defense acquisition programs and a reduction in the average number of statutory significant or critical unit cost breaches.

The cost analysis community is also dealing with challenges in workforce management due to significant increases in workload that have resulted from the new acquisition pathways and additional congressional requirements for expanded cost data collection, without commensurate increases in resources. Skills required to deliver cost estimation and analysis are highly sought in industry, and DoD must compete for these limited resources. The leadership in CAPE and the military departments is coping with this imbalance of increased workload and limited resources by prioritizing the activities of the cost analysis community.

Although the DoD cost analysis community has made significant progress, there is more work to be done. This Annual Report of Cost Assessment Activities provides a summary of our activities to date and our plans for the future in achieving the vision of independent, rigorous, and objective cost and schedule estimates, based on solid analytic methods, tools, and data.



Susanna V. Blume

Director

Cost Assessment and Program Evaluation

CHAPTER I. INTRODUCTION

The Director of Cost Assessment and Program Evaluation (DCAPE), a position established by the Weapon Systems Acquisition Reform Act of 2009 (WSARA), is the principal official for independent cost estimation and cost analysis. DCAPE ensures that Department of Defense (DoD) acquisition programs have realistic cost estimates and accurate cost information.

In fulfilling this responsibility for DoD, CAPE:

- Prescribes policies and procedures for conducting cost estimation and other cost analyses
- Conducts independent cost estimates (ICEs) and other independent cost analyses
- Reviews all cost estimates and cost analyses conducted in connection with major defense acquisition programs (MDAPs) and other acquisition programs
- Conducts cost analyses of major programs to be procured using multiyear contract authority
- Prescribes policies and procedures for reporting and collecting actual cost data and other related information for acquisition programs
- Provides leadership in educating and training DoD cost analysis communities
- Issues guidance about giving full consideration of life-cycle management and sustainability costs in MDAPs and other acquisition programs

This year's Annual Report on Cost Assessment Activities is organized as follows:

- Chapter II provides an overview of cost analysis in DoD. The chapter describes the types and purposes of cost analysis organizations throughout the Department and explains the procedures for preparing cost estimates that support the defense acquisition process. This chapter also introduces the main DoD systems that collect actual data and information on the contract and government costs of programs. Some of the key points in this chapter are:
 - **DoD Cost Organizations.** Cost organizations are embedded throughout the Department at the Office of the Secretary of Defense (OSD), at the headquarters of the military departments and defense agencies, and at field-level acquisition organizations. These organizations conduct a wide range of cost estimation and analysis activities. Each cost organization serves a unique role but also contributes to the collective efforts of the cost analysis community as a whole.
 - **Procedures for Cost Assessments.** CAPE is responsible for nine major documents that provide guidance to DoD organizations concerning cost assessment policy and procedures. These documents are:
 - DoD Directive (DoDD) 5105.84, *Director of Cost Assessment and Program Evaluation (DCAPE)*
 - DoD Instruction (DoDI) 5000.73, *Cost Analysis Guidance and Procedures*

- DoD Manual (DoDM) 5000.04, *Cost and Software Data Reporting (CSDR) Manual*
- *Operating and Support Cost-Estimating Guide*
- *DoD Cost Estimating Guide*
- *Inflation and Escalation Best Practices for Cost Analysis: Analyst Handbook*
- *Analysis of Alternatives Cost Estimating Handbook*
- DoDI 7041.04, *Estimating and Comparing the Full Costs of Civilian and Active Duty Manpower and Contract Support*
- DoDI 7041.03, *Economic Analysis for Decision-making*

The first seven documents are the primary vehicles for implementing the cost assessment provisions associated with defense acquisition programs. CAPE's efforts to publish procedures for all cost assessment activities are now mainly complete. All nine documents are in compliance with the OSD standard to be reviewed annually and updated within a 10-year period.

The policies and procedures for cost assessment for MDAPs and other acquisition programs are provided in DoDI 5000.73. Specific topics include processes and timelines for cost assessment activities supporting milestone reviews, cost analysis in support of the decision to release a request for proposal (RFP) for development, formal cost positions and full funding commitments, cost assessment procedures for sustainment reviews, cost estimates for multiyear procurement contracts for major programs, and cost estimates for contract negotiations. CAPE guidance on cost assessment procedures has been expanded to address the variety of new acquisition pathways created by statute and DoD acquisition policy, to ensure that rigorous cost estimating and cost data collection are maintained for all possible acquisition approaches.

- **Cost Assessment Data Enterprise (CADE).** CAPE has partnered with the military department cost agencies to implement the CADE vision of a centralized data warehouse and virtual library for DoD's government cost analysts, providing authoritative cost, acquisition, and technical data sources that are easily searchable and retrievable in a secure environment.
- **EVAMOS.** CAPE is statutorily required to develop and maintain a comprehensive, enterprise-wide operating and support (O&S) cost data system, which is known as Enterprise Visibility and Management of Operating and Support Cost (EVAMOS), that will allow DoD to better track and assess system O&S costs and improve cost estimation over a system's life cycle. EVAMOS provides O&S maintenance and manpower cost data for Army systems and Marine Corps ground systems, which addressed the largest known deficiencies in the current O&S cost data systems. O&S cost data collection for Navy systems will be available in fiscal year (FY) 2024 and for Air Force systems in FY 2027. Space Force systems will be addressed at a later date, to be determined.

- Chapter III summarizes DoD’s FY 2023 cost estimation and cost analysis activities associated with MDAPs and other acquisition programs. These activities inform acquisition decision authorities at milestone reviews and at other acquisition decision points. This chapter also summarizes the degree to which DoD cost estimation and assessment activities in FY 2023 complied with established procedures. In addition, this chapter provides an assessment of the quality and accuracy of the cost estimates. Some of the notable highlights in this chapter are:
 - **Cost Assessment Activities**
 - CAPE provided one ICE that supported a review of an MDAP program where the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) was the Milestone Decision Authority (MDA).
 - CAPE provided three ICEs and reviewed three military department cost estimates that supported milestone or other reviews for MDAP programs where the Component Acquisition Executive (CAE) was the MDA.
 - CAPE provided a cost analysis for a program that experienced a critical unit cost (Nunn-McCurdy) breach prior to the Department’s certification of the program to Congress.
 - CAPE reviewed 18 military department ICEs that supported sustainment reviews of major weapon systems.
 - CAPE independently estimated the cost savings for five potential multiyear procurement contracts for major programs.
 - **Assessment of Compliance, Quality, and Accuracy.** The cost assessment activities in FY 2023 complied with the established procedures described in Chapter II. The quality of the cost estimates produced by both CAPE and the military departments has continued to improve, largely due to better data and training for the cost analysis community. Cost estimates have also improved due to increased rigor and more disciplined processes. The annual number of statutory unit cost breaches after the enactment of WSARA in 2009 remains low relative to the period before WSARA. Additionally, acquisition cost growth for the MDAPs, and O&S cost growth for major weapon systems, have dropped considerably since the enactment of WSARA.
 - **Other Cost Assessment Activities**
 - CAPE completed an ICE and comprehensive assessment of three design options for the F-35 fighter engine. This study was provided to the congressional defense committees in April 2023 as directed by the House Committee on Appropriations.
 - CAPE provided considerable analytic support to the trilateral Indo-Pacific security agreement between Australia, United Kingdom, and the United States known as AUKUS concerning the delivery of a nuclear-powered

attack submarine to Australia and the enhancement of the submarine industrial base of all three nations.

- In support of the FY 2024 DoD Program Budget Review, CAPE prepared an independent estimate of the development cost of a Missile Defense Agency program known as the Glide Phase Interceptor program that is an important element in defending against hypersonic missiles.
 - CAPE estimated the cost savings of using block buy contracts for the CH-53K airframe and the CH-53K engine. This estimate supported a DoD certification provided to the congressional defense committees as required by the National Defense Authorization Act (NDAA) for FY 2023.
 - CAPE completed an ICE of the Resilient Missile Warning and Tracking program that was provided to the congressional defense committees as requested by the explanatory statement accompanying the Consolidated Appropriations Act, 2023.
 - The NDAA for FY 2022 called for CAPE to identify the data required for a new system that will replace Selected Acquisition Reports (SARs) for reporting the status of MDAPs and other acquisition programs. CAPE provided USD(A&S) with its final recommendations in January 2023.
- Chapter IV describes the status of ongoing initiatives that are intended to improve and modernize DoD's cost assessment functions. These initiatives address a wide range of issues and concerns, including leadership for the cost analysis community as a whole, cost estimation policies and procedures, cost tools and data systems, and education and training for the DoD cost analysis community. Some of the notable highlights in this chapter are:
 - **Enhanced Collection of Cost Data.** Feedback from government users has identified desired improvements to the cost data being collected, noting gaps in coverage where important cost data are not being collected. CAPE and the military department cost agencies have established several initiatives to address these concerns and increase efficiency through better business processes and the use of advancements in information systems technology. These initiatives include the following:
 - CAPE has modernized cost data reporting by enabling contractors to submit low-level cost data, called the Cost and Hour Report (FlexFile), directly from its accounting systems. These reports give DoD greater insight and in a more cost-effective manner than the legacy reporting provides. The transition from the legacy cost reports to FlexFile reports is now underway.
 - **Cost Analysis Education and Training.** CAPE and the military department cost agencies have worked with the Defense Acquisition University (DAU) to redesign the curriculum and course content supporting professional certification in cost estimating. This redesign has supported a DoD initiative known as Back-to-Basics that established a streamlined certification structure for the Business-Cost

Estimating workforce. This redesign also addressed education and training specific to CADE and its supporting cost data; these have been incorporated into the curricula at DAU and other educational institutions. CAPE also has established a dedicated CADE training team that provides numerous virtual training and outreach activities to government organizations and defense industry contractors throughout the country. CADE users, many of whom now frequently work from home, have access to modern on-line training, live webinars, office hour support, and several user guides and videos.

This report includes the following appendices that provide background information relevant to cost assessment activities:

- Appendix A enumerates the cost analysis organizations in the Department.
- Appendix B describes MDAP unit cost reporting and unit cost breach thresholds.
- Appendix C describes additional CAPE guides and handbooks that support the DoD cost analysis community.
- Appendix D enumerates recent CAPE policy memos that pertain to cost data reporting.
- Appendix E provides additional information on CADE and DoD cost data collection systems.
- Appendix F describes recent legislative changes to defense acquisition statutory requirements and related acquisition and cost assessment policy and procedures.
- Appendix G provides additional information on CAPE efforts to support training and education for the DoD cost analysis community.
- Appendix H provides a description of the DoD sustainment review activities held in FY 2021 and FY 2022.

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CHAPTER II. OVERVIEW OF COST ANALYSIS IN DOD

This chapter provides an overview of DoD's organizations, policies, procedures, and supporting data systems for cost estimation and analysis.

Cost Analysis Organizations in DoD

Cost organizations are distributed throughout DoD: at OSD, at the headquarters of the DoD Components (i.e., military departments and defense agencies), and across DoD field organizations. Each cost organization serves a unique purpose and function but also complements the family of cost organizations supporting the defense acquisition process and DoD's broad and diverse operations. This diversity helps foster best practices and teamwork within the cost analysis community. Appendix A provides more details on the roles and missions of the various DoD cost analysis organizations.

At the OSD level, CAPE is the principal office for independent cost estimation and cost analysis. In addition, CAPE is responsible for ensuring that DoD's cost estimation and cost analysis processes provide accurate information and realistic estimates of cost for the major acquisition programs of the Department. CAPE provides policy for and oversight of DoD cost assessment activities. CAPE may also provide ICEs for acquisition programs under certain circumstances explained later in this chapter, or it may review a DoD Component ICE under other circumstances.

Each military department headquarters has its own cost agency or other organization to provide senior decision-makers with a wide variety of cost and economic analyses to support acquisition, programming, and budget decisions. These analyses may address individual weapon systems or broader issues, such as force structure or installations. The military department cost agencies or other organizations may provide policy guidance that is unique to each of the DoD Components. In some circumstances, these cost estimating agencies provide ICEs for acquisition programs managed by their respective DoD Component.¹

Numerous field-level cost organizations also provide resources to support higher headquarters' cost estimates and analyses and the day-to-day operations of program offices and similar entities. Examples of such activities include evaluating contractor proposals and conducting should-cost reviews; providing support to competitive source selections; preparing cost estimates to support the programming and budgeting processes; and developing cost estimates used in specific analytic studies, such as systems engineering design trades or Analyses of Alternatives (AoAs). Field-level and program office members of the cost analysis community often possess important specialized cost and technical experience unique to specific systems or commodity groups, such as satellites, submarines, or tactical missiles.

¹ The Department of the Navy (DoN) has restructured its cost estimating organizational structure in recent years. These changes are described in Appendix A.

Cost Assessment Procedures

DoDD 5105.84, *Director of Cost Assessment and Program Evaluation (DCAPE)*, was most recently issued on August 14, 2020, and serves as the CAPE charter. The directive defines overall CAPE roles, responsibilities, and authorities in the planning, programming, budgeting and execution (PPBE); acquisition; and requirements processes. Regarding cost assessment, this directive establishes DCAPE as the principal official for independent cost estimation and cost analysis for DoD acquisition programs.

DoDI 5000.73, *Cost Analysis Guidance and Procedures*, is the primary guidance for DoD cost estimating policies and procedures and implements the cost assessment provisions in statute applicable to DoD. In particular, this instruction provides guidance to the military departments and defense agencies concerning the preparation, presentation, and documentation of life-cycle cost estimates for acquisition programs. It also assigns roles and responsibilities and describes the processes and timelines for various cost assessment activities.

The latest version of the instruction was issued in March 2020. The revision added procedures and timelines for the new acquisition pathways created by statute and DoD acquisition policy. These pathways were introduced in DoDI 5000.02, *Operation of the Adaptive Acquisition Framework*, issued in January 2020. These pathways provide options for program managers and senior acquisition officials to develop acquisition strategies that match the characteristics of the capability being acquired. The adaptive acquisition pathways are shown in Figure 1.

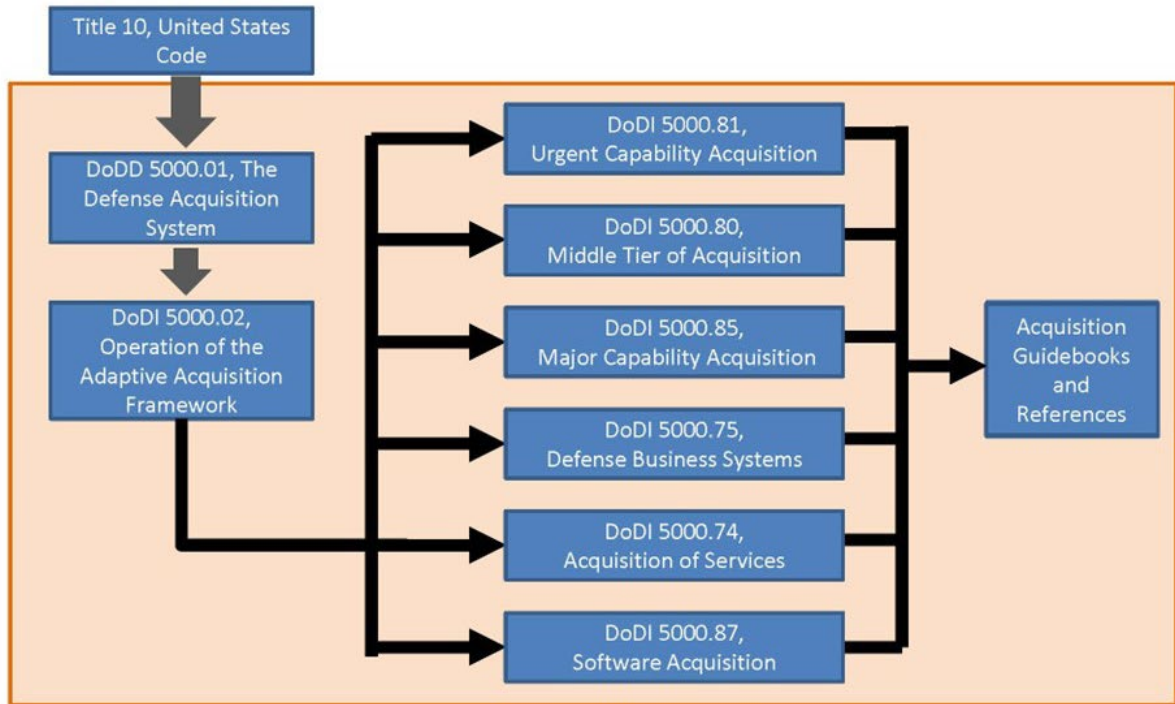


Figure 1. Adaptive Acquisition Pathways

CAPE and the military department cost agencies have expanded DoD cost estimating and analysis policies and procedures to ensure that rigorous cost estimating and cost data collection are maintained for all of the possible acquisition strategies.

The directives and instructions are available on the Executive Services Directorate website at <https://www.esd.whs.mil/DD/>.

Several guidebooks also are aligned with the new acquisition policies. These guidebooks, and where available, additional relevant reference materials are provided on the Defense Acquisition University website at <https://aaf.dau.edu/guidebooks/>.

Major Capability Acquisitions

The term “major capability acquisition” refers to MDAPs (i.e., Acquisition Category (ACAT) I programs), major systems (i.e., ACAT II programs), and other capabilities developed by the major capability acquisition pathway.

As required by Section 3221 of Title 10, United States Code (U.S.C.), CAPE conducts or approves ICEs and cost analyses for MDAPs and major subprograms:

- Before any decision to grant Milestone A or Milestone B approval under Sections 4251 or 4252 of Title 10, U.S.C., respectively
- Before any decision to enter low-rate initial production (LRIP) or full-rate production (FRP)

- Before any certification under 10 U.S.C. § 4376 following a critical unit cost (commonly known as Nunn-McCurdy) breach. Appendix B describes the procedures for MDAP unit cost reporting and the criteria for a critical unit cost breach
- Before any decision to enter into a contract in connection with a military construction project of a value greater than \$500,000,000
- At any other time considered appropriate by DCAPE, upon the request of USD(A&S), or upon the request of the MDA

The requirement for CAPE to conduct or approve an ICE or cost analysis before any decision to enter into a contract in connection with a military construction project having a value greater than \$500,000,000 was added by the NDAA for FY 2023. CAPE is working with the military departments to establish a process and timeline for these cost estimates.

In accordance with 10 U.S.C. § 3221, CAPE must conduct or approve an ICE or cost estimate for the decision points listed above. In order to do so, CAPE may (1) review and approve the ICE prepared by the military department cost agency (or defense agency equivalent), which entails reviewing the DoD Component cost position (CCP), reviewing the funding position selected by the MDA, and providing a written summary of its review and findings to the MDA; (2) prepare the ICE when considered appropriate by DCAPE or upon the request of USD(A&S) or the MDA; or (3) work with the military department cost agency to collaboratively develop an ICE that CAPE subsequently approves. In the cases in which CAPE prepares the ICE, the military department cost agency (or defense agency equivalent) conducts its own cost analyses in accordance with DoD Component policy. These cost analyses typically consist of a program office estimate and a DoD Component cost estimate. The DoD Component cost estimate may consist of a military department cost agency (or defense agency equivalent) estimate, independent assessment of the program office estimate, or some other similar cost analysis.

In addition, the MDA may request a cost analysis in support of a decision to release the development RFP for MDAPs. In such cases, CAPE may (1) prepare an ICE or other cost analysis; (2) review and approve a military department (or defense agency equivalent) ICE or cost analysis; or (3) delegate responsibility for the cost analysis to the military department or defense agency.

DoD Component Cost Position and Full Funding Commitment

CAPE policy for MDAPs requires the DoD Component to establish a formal position on the estimated cost of the program and commit to fully fund the program in the future years defense program (FYDP). The DoD Component establishes a documented CCP for all MDAPs prior to the Milestone A, B, and C (or LRIP) reviews and the FRP decision. The CCP is derived from the DoD Component cost estimate and the program office estimate in accordance with DoD Component policy. The CCP is signed by the DoD Component Deputy Assistant Secretary for Cost and Economics (or defense agency equivalent) and includes a date of record.

CAPE policy for major acquisition programs also requires the MDA to certify that a program is or will be fully funded. Following the meeting of the Defense Acquisition Board (DAB) or DoD Component equivalent, the MDA will document this decision in an acquisition decision memorandum (ADM) that certifies that the DoD Component will fully fund the program to either

the CCP or the ICE in the current FYDP or will commit to full funding of the CCP or ICE during the preparation of the next FYDP. A full funding certification statement in the ADM is required at the Milestone A, B, and C (or LRIP) reviews and the FRP decision.

Sustainment Reviews

Section 4323 of Title 10, U.S.C., requires that each military department conduct a sustainment review of each covered system² 5 years after declaration of initial operational capability (IOC) and every 5 years thereafter throughout the life cycle of the program. Each sustainment review includes an ICE for the remainder of the life cycle of the program. In DoDI 5000.73, CAPE has three options for preparing the ICE: it may choose to (1) prepare the ICE; (2) review and approve a military department or defense agency equivalent ICE; or (3) delegate responsibility for the ICE to the DoD Component. In all cases, the ICE will be briefed at the sustainment review, and a copy of the ICE report will be provided to CAPE for archiving in CADE.

Section 4323 of Title 10, U.S.C., was amended in 2021 to add a requirement to report any critical O&S cost growth. The term “critical O&S cost growth” means O&S cost growth of at least 25 percent more than the estimate documented in the most recent ICE for the covered system, or at least 50 percent more than the estimate documented in the original baseline estimate for the covered system.

Cost Estimates for Contract Negotiations

Section 3226 of Title 10, U.S.C., specifies that the policies, procedures, and guidance issued by CAPE shall provide that the cost estimates developed for baselines and other program purposes pursuant to 10 U.S.C. § 3221(b)(6) must not be used for the purpose of contract negotiations or the obligation of funds. Section 3226 also requires that the USD(A&S) develop policies, procedures, and guidance to ensure that cost analyses and targets developed for the purpose of contract negotiations and the obligation of funds are based on the government’s reasonable expectation of successful contractor performance in accordance with the contractor’s proposal and previous experience.

In the defense acquisition process, the MDA establishes a program baseline and directs that programs be funded to the ICE or DoD Component Cost Position. However, program managers are expected to strive for lower costs where possible and should take initiatives to identify and achieve savings below budgeted most-likely costs. In particular, should-cost reviews can be used during proposal evaluations and contract negotiations (particularly for sole source procurements) throughout program execution, including during sustainment, to evaluate the economy and efficiency of a contractor’s operations and processes.

The CSDR reports described later in this chapter provide additional insight and support multiple studies throughout the DoD cost and acquisition communities concerning contract profits and fees for both prime contractors and major subcontractors. Acquisition professionals can review this information to assess the extent that realized profits and fees for completed acquisition programs

² A covered system is a weapon system acquired as an MDAP or an MTA program that is projected to eventually reach MDAP dollar thresholds.

have been compatible with current guidelines contained in defense policy and regulations. They can then use that information in negotiations concerning ongoing acquisition programs.

Middle Tier of Acquisition

The middle tier of acquisition pathway was established by Section 804 of the NDAA for FY 2016. Section 804 provided DoD with the authority to establish a “middle tier” of acquisition programs intended to be completed within 5 years from the start of the MTA program. The MTA process provides two possible acquisition paths: (1) rapid prototyping (prototypes with innovative technologies); and (2) rapid fielding (new or upgraded systems with minimal development). For the rapid prototyping path, the objective is to field a prototype that meets defined requirements that can be demonstrated in an operational environment and provide a residual operational capability within 5 years from the program start date. For the rapid fielding path, the objective is to complete fielding of the program within 5 years from the program start date. MTA programs fall between “urgent acquisitions” that are generally completed within 6 months to 2 years, and “traditional” acquisition programs that last much longer than 5 years.

Programs in the middle tier of acquisition pathway follow streamlined procedures and are exempt from the traditional requirements and acquisition processes. Section 804 also requires that the USD(A&S) guidance for MTA establish a process for transitioning successful prototypes to production and fielding under the rapid fielding pathway or the traditional acquisition process. Under this guidance, DoD Components transition successful MTA prototypes to the rapid fielding pathway or to the major capability acquisition process.

DoD guidance for MTA programs is provided in DoDI 5000.80, *Operation of the Middle Tier of Acquisition (MTA)*, issued in December 2019. CAPE established procedures for estimating costs of MTA programs in the latest revision to DoDI 5000.73. For rapid prototyping programs, CAPE or the responsible military department cost agency (determined on a case-by-case basis) must prepare an estimate of life-cycle costs for programs likely to exceed MDAP dollar thresholds.³ For rapid prototyping programs that fall below the MDAP dollar thresholds, cost estimates will be prepared in accordance with guidance issued by the responsible military department cost agency. For the rapid fielding programs, CAPE or the military department cost agency will prepare an estimate of life-cycle costs for programs likely to exceed MDAP or major system dollar thresholds.⁴ For either case, CAPE and the director of the responsible military department cost agency will determine the organization responsible for the life-cycle cost estimate for an MTA program after the decision is made to pursue a program using the MTA pathway.

³ An MDAP is a program with expenditures expected to exceed \$525 million (FY 2020 constant dollars) for research, development, test, and evaluation, or \$3.065 billion (FY 2020 constant dollars) for procurement.

⁴ A major system is a program other than an MDAP with expenditures expected to exceed \$200 million (FY 2020 constant dollars) for research, development, test, and evaluation, or \$920 million (FY 2020 constant dollars) for procurement.

Other Acquisition Pathways

For defense business systems, CAPE may conduct a cost estimate at DCAPE's discretion. For all other cases, the military department cost agency or defense agency equivalent will conduct cost analyses or delegate this responsibility to another organization. Cost analyses will be conducted for each phase of the business capability acquisition cycle in order to support authority-to-proceed decision points.

For contracted services, CAPE may conduct a cost estimate at DCAPE's discretion. All other cost estimates for contracted services will be conducted in accordance with the policies and procedures issued by the relevant military department cost agency or defense agency equivalent.

For software acquisition, CAPE will conduct or approve an estimate of costs for programs likely to exceed MDAP or major system thresholds before the program enters the execution phase. CAPE may, at its discretion, delegate the authority for the cost estimate to the military department cost agency or defense agency equivalent. Estimates for software programs that do not exceed the major system threshold will be conducted according to the policies and procedures issued by the relevant military department cost agency or defense agency equivalent.

Cost assessment procedures for defense business systems, contracted services, and software acquisitions will need to be validated or refined based on lessons learned from actual experience.

Missile Defense System Programs

The programs of the Missile Defense Agency are exempt from the traditional DoD acquisition processes and procedures. Instead, in March 2020, the Deputy Secretary of Defense issued Directive-type Memorandum 20-002, *Missile Defense System Policies and Governance*. This memorandum was most recently updated in February 2024. This memorandum establishes policy, assigns responsibilities, and prescribes procedures for missile defense system programs. In this memorandum, for each missile defense system element that exceeds MDAP dollar thresholds or may be of particular interest, CAPE (1) develops an ICE before the product development decision or the production decision, and (2) identifies and recommends to the Deputy Secretary of Defense sources of funding at a funding level consistent with the CAPE ICE. The director of the Missile Defense Agency develops a life-cycle cost estimate and an affordability analysis that are provided to CAPE before the product development decision for each missile defense system program.

Missile Defense Agency programs are subject to the statutory provisions of 10 U.S.C. § 225. Section 225 requires the director of the Missile Defense Agency to establish and maintain an acquisition baseline for each program element of the ballistic missile defense system and each designated major subprogram of such program elements. Among other elements, the acquisition baseline includes a life-cycle cost estimate that separately identifies the costs regarding research and development, procurement, military construction, operations and sustainment, and disposal; program acquisition unit costs for the program element; and average procurement unit costs for the program element. Each year, the director submits to the congressional defense committees a report on the current acquisition baselines, including an identification of any changes or variances made to the elements of each current acquisition baseline as compared to the original acquisition baseline or the acquisition baseline submitted in the report during the previous year. Each life-

cycle cost estimate included in an acquisition baseline includes all of the operations and sustainment costs for which the director is responsible, and a description of the operations and sustainment functions and costs for which a military department is responsible.

Section 225 of Title 10, U.S.C., was amended by Section 1652 of the NDAA for FY 2023. As a result, each annual report on the acquisition baselines now includes a broader and more comprehensive estimate of the total system costs for each program element—consisting of research and development, procurement, military construction, operations and sustainment, and disposal—without regard to funding source or management control (such as the Missile Defense Agency, a military department, or other element of DoD). The term total system cost also now includes, for each program element, (1) all combined costs from closed, canceled, and active acquisition baselines, (2) any costs shifted to or a part of future efforts without an established acquisition baseline, and (3) any costs under the responsibility of a military department or other Department entity. Section 1652 also expands the reporting for those operations and sustainment functions and costs for which a military department is responsible. The operating and sustainment cost estimates now must include (1) the amount of operations and sustainment costs (dollar value and base year) for which the military department or other DoD organization is responsible, (2) a citation of the source of the estimate (such as a joint cost estimate or one or more military department estimates), (3) the date the source was prepared, and (4) a statement as to if and when the source was independently verified by CAPE.

Role of the Independent Cost Estimate

Acquisition programs are supported by ICEs at milestone reviews and other program decision points. In practice, an ICE is conducted by using a combination of historical data and precedents, results of extensive site visits, and the actual performance of that program to date. It is a careful and comprehensive analysis that looks at all aspects of a program, including risks.

At a minimum, an ICE allows decision-makers to ensure that (1) current program cost estimates are reasonable, considering cost, schedule, and technical risks; (2) initial program baselines established for cost and schedule are realistic and achievable; (3) subsequent program baselines remain realistic; and (4) sufficient funding is available in the FYDP to execute the program without significant adjustments to the program's budgets. However, CAPE's experience is that an ICE should also support much broader program decisions. The ICE should include a discussion of risks, the potential impact of risks on program costs and schedule, and approaches to mitigate risks. An ICE can also provide decision-makers with insights concerning:

- Unique challenges of each program and options available to address them
- Balanced requirements based on trade-offs among cost, capabilities, and schedule
- Alternative acquisition and contracting strategies to improve ways to do business
- Options to achieve better program outcomes as circumstances change or unexpected events occur

Multiyear Procurement Contracts

Section 3501(h) of Title 10, U.S.C., establishes several criteria that must be satisfied and certified by the Secretary of Defense prior to the award of a multiyear contract in an amount equal to or

greater than \$500 million (then-year dollars) for a defense acquisition program. This certification is included as part of the DoD notification to the congressional defense committees of the intent to award a multiyear contract. This notification, by law, must be provided at least 30 days before the contract award.

Some of these criteria (concerning substantial savings, realistic cost estimates, and availability of funding) may be supported by a CAPE cost analysis of the proposed multiyear procurement (MYP) strategy and contract structure. A CAPE cost analysis includes a comparison of the estimated costs of multiyear versus annual contract awards. This analysis is based on the most recent cost information, including actual cost data and experience to date, as well as an evaluation of cost realism in the contractor's proposal.

Until recently, for each MYP candidate, CAPE was required to provide a preliminary cost analysis of the potential cost savings that could be obtained through an MYP contract compared to a baseline of annual procurement contracts. This analysis supported a DoD decision to submit a legislative proposal to Congress for a specific authorization by law to carry out the MYP strategy. However, Section 815 of the NDAA for FY 2023 streamlined the process for submitting the MYP request and eliminated the statutory requirement for a CAPE preliminary cost analysis. However, CAPE will continue to prepare and document preliminary MYP contract savings estimates to provide a benchmark to government personnel to support the negotiation process and the subsequent update of the CAPE cost estimate made prior to contract award.

Foreign Military Sales

In a few cases, cost estimates are made for programs that have plans or the potential for foreign military sales (FMS). FMS cases have significant possible benefits in lowering the costs of programs to the United States, since the procurement of additional systems will lead to unit cost reductions for all parties. In some cases, the foreign country may also contribute to the recoupment of previous development costs. However, quantifying these benefits in cost estimates can often be challenging due to the complexities of issues such as coproduction, tie-ins with U.S. MYP contracts, and forecasting the effects on contractor business bases and rates. For example, a significant portion of the MYP savings for aircraft programs resulted from higher FMS after a U.S. MYP contract award. Nevertheless, assessing the implications of FMS provides a better understanding of the complete costs for the United States. This assessment includes working with the defense contractors to collect cost data for FMS efforts to provide the requisite insights. In recent years, CAPE has made considerable progress in improving the cost analysis community's tools, methods, and policies for cases involving FMS.

Additional Guidance and Procedures for Cost Assessment Activities

CAPE provides additional guidance on DoD cost assessment activities through additional instructions and guides. These supplemental publications are discussed in Appendix C. In recent years, CAPE has also issued several policy memos that pertain to cost assessment and cost data reporting. These policy memos are listed in Appendix D.

Cost Assessment Data Enterprise

CAPE has partnered with the military department cost agencies staff to implement the CADE vision of a centralized data warehouse and virtual library, which houses seamless, integrated, authoritative data sources that government analysts can easily search and utilize. CADE provides analysts immediate access to the complete range of available cost and related data. CAPE has also worked with USD(A&S) to capitalize on the acquisition data and reports already collected in the various acquisition information systems and to integrate them with cost data to provide government analysts with a full view of a weapon program or portfolio. Additionally, CADE includes a document repository to house ICEs, CCPs, Cost Analysis Requirements Descriptions (CARDs), CAPE briefings to the DAB and other acquisition decision-making groups, and other documents and briefings. These documents are stored in the CADE library and accessible only to government personnel.

CADE not only stores authoritative cost, acquisition, and technical data but also provides analysts with a modern data warehouse environment where the data are easily searched and displayed in an integrated web-based application. CADE provides a bulk export tool that allows users—with a single query—to combine all selected cost data reports into a single file ready for analysis.

The CADE home page supports analysts by offering two modes to access data. The first mode supports queries for CSDR and other data in the CADE data warehouse or library across multiple programs. Queries can be made by service or weapon system commodity type. A step-by-step guide for using the home page is provided in a Data and Analytics User Guide. The second mode supports analyst queries by individual program. This mode provides a history of program information (including acquisition cost and quantity, schedule events, and unit procurement cost) as reported in the program SARs over the years. This mode allows access to the CSDR by contract and report type for each program; it also allows access to CARDs and other library documents and other files for each program.

In addition, CADE provides analysts with a collection of downloadable software tools. Another CADE feature is the Datasets, Tools, and Models Hub (DTMHub), which allows organizations to endorse and share their datasets, tools, and models with the cost analysis community. Users can search for items of interest by organization, keyword, branch of service, or commodity (such as aircraft or ship). Alternatively, users can access a specific application and download items and user guides.

At the time of the publication of this report, there are over 2,000 government CADE users and over 1,000 industry data providers and support contractors.

EVAMOSC

Section 832 of the NDAA for FY 2019 requires DoD to implement the recommendations submitted as part of the independent assessment produced under Section 844 of the NDAA for FY 2017, including:

- Developing a common data repository for all sustainment-related data

- Creating and implementing common data definitions, structure, and business rules for sustainment cost data
- Providing a consistent, predictable funding stream for O&S cost databases, prioritizing department-wide accessibility
- Developing a common data structure, taxonomy, and data dictionary for all three military department Visibility and Management of Operating and Support Cost (VAMOSOC) systems
- Establishing a common logon procedure for the VAMOSOC systems and CADE

As a result, CAPE now has a demanding statutory requirement to develop a comprehensive enterprise-wide O&S cost data system: EVAMOSOC.

EVAMOSOC addresses known deficiencies with the completeness, accuracy, granularity, and reporting frequency of current O&S cost data by working with subject matter experts and data providers within the military departments. EVAMOSOC uses a modern, cloud-based architecture that is scalable to accommodate large amounts of data from a wide array of systems currently serving several functional communities. These communities include financial management, logistics, maintenance, human resources, property, and acquisition. EVAMOSOC also leverages recent advancements in the DoD data landscape, such as enterprise resource planning information systems (being implemented to support financial auditability), and DoD’s initiative to establish a common enterprise data repository known as Advana (derived from the term “Advancing Analytics”).

EVAMOSOC data are standardized to conform to the terms and definitions provided in the CAPE *Operating and Support Cost-Estimating Guide* described in Appendix C. The EVAMOSOC team is working closely with stakeholders across DoD to ensure that weapon system O&S cost data are consistent across the military departments, clearly documented, and useful to DoD stakeholders.

The initial contract for the development and deployment of EVAMOSOC was awarded in September 2020, with development and deployment occurring incrementally through 2026. The first phase focused on maintenance cost data for Army ground vehicles; this effort was completed in November 2021. The second phase, occurring in 2022 and 2023, focused on Marine Corps ground systems and additional O&S cost data for Army systems. These first two phases addressed the largest identified deficiencies in the completeness of current O&S cost data systems. EVAMOSOC now provides unit-level manpower costs for all Army major weapon systems and Marine Corps ground systems by allocating payroll data from the Defense Manpower Data Center (a first for DoD). Also, in 2023, CAPE awarded a contract to import and transform Navy O&S cost data. EVAMOSOC has established automated connections with the Navy Advana system (known as Jupiter) and other data sources for ship maintenance data. Navy data will be available to EVAMOSOC users beginning in 2024, and Air Force data will be available beginning in FY 2027. Space Force data will be available at a later date, to be determined.

Additional information regarding EVAMOSOC is provided in Appendix E.

DoD Cost Data Collection

CAPE is responsible for prescribing policy and procedures for reporting and collecting actual cost data that are used throughout the cost analysis community. Systematic and institutionalized cost data collection and validation is critical to preparing and supporting credible cost estimates. The CSDR system serves as the primary source of cost data for major contracts and subcontracts associated with MDAPs and certain other acquisition programs. Procedures and implementation guidance for the CSDR system are provided in DoDM 5000.04, *Cost and Software Data Reporting*. This manual was updated in May 2021 to provide implementation details concerning the latest cost data collection and reporting requirements that were issued in the March 2020 revision to DoDI 5000.73. Additional information on the CSDR Manual is provided in Appendix C. Additional information on the CSDR system is provided in Appendix E.

The three VAMOSOC systems (one system for each military department) collect historical O&S costs for major fielded weapon systems. Additional information on the three VAMOSOC systems is provided in Appendix E.

CHAPTER III. DOD COST ASSESSMENT ACTIVITIES IN FY 2023

This chapter summarizes DoD cost estimates and cost analyses that were completed in FY 2023 to support MDAP milestone and other acquisition reviews, MDAP critical unit cost breaches, multiyear procurements, and other cost analyses. This chapter also provides some observations regarding compliance with policy and procedures, the differences between the CAPE and DoD Component cost estimates over time, and an assessment of the quality of the cost estimates over time in terms of cost growth metrics.

MDAP Milestone or Other Review Cost Assessment Activities

Table 1 summarizes the cost assessment activities in FY 2023 that supported milestone or other reviews of MDAPs when the MDA was USD(A&S). Table 1 identifies the program name and acronym, the responsible DoD Component, the supporting cost estimates or analyses presented to the MDA, and the review event being supported.

Table 1. Cost Assessment Activities in FY 2023 for MDAP Milestone or Other Reviews subject to USD(A&S) Decision

Program Name	Acronym	DoD Component	Cost Assessment Activity	Activity Date	Supported Event	Event Date
Integrated Air and Missile Defense	IAMD	Army	CAPE Independent Cost Estimate	4/10/2023	Full-Rate Production Decision	4/10/2023
			Army Cost Position	4/6/2023		

Table 2 summarizes the cost assessment activities in FY 2023 that supported milestone or other reviews when the MDA was the service acquisition executive (SAE). For each MDAP with a milestone review or other event, Table 2 identifies the program name and acronym, the responsible DoD Component, the supporting cost estimate(s) or analyses presented to the MDA, and the review event being supported.

Table 2. Cost Assessment Activities in FY 2023 for MDAP Milestone or Other Reviews subject to SAE Decision

Program Name	Acronym	DoD Component	Cost Assessment Activity	Activity Date	Supported Event	Event Date
CH-53K King Stallion	CH-53K	Navy	CAPE Independent Cost Estimate	1/31/2023	Approval of Acquisition Program Baseline	2/8/2023
			Navy Cost Position	12/14/2022	Full-Rate Production Decision	12/21/2022
MH-139A Grey Wolf	MH-139A	Air Force	Air Force Independent Cost Estimate	2/27/2023	Milestone C	3/3/2023
			Air Force Cost Position	2/27/2023		
HH-60W Jolly Green II	HH-60W	Air Force	Air Force Independent Cost Estimate	4/11/2023	Full-Rate Production Decision	4/27/2023
			Air Force Cost Position	4/11/2023		
E-6B Recapitalization	E-XX	Navy	CAPE Review	9/11/2023	Release of RFP for EMD	9/22/2023
			Navy Cost Position	7/21/2023		
Armored Multi-Purpose Vehicle	AMPV	Army	CAPE Independent Cost Estimate	9/22/2023	Approval of Acquisition Program Baseline	10/27/2023
			Army Cost Position	8/17/2023	Full-Rate Production Decision	8/21/2023
Mk21A Reentry Vehicle	Mk21A RV	Air Force	CAPE Independent Cost Estimate	9/30/2023	Milestone B	10/27/2023
			Air Force Cost Position	7/24/2023		

Remarks about Specific Programs

- For the CH-53K program, the CAPE ICE was updated to reflect a procurement quantity of two aircraft provided by the Consolidated Appropriations Act, 2023, in order to support the approval of the Acquisition Program Baseline.
- For both the MH-139A and HH-60W, CAPE reviewed and approved the Air Force ICE and concurred with the Air Force decision to use the Air Force ICE to establish the program baseline.
- For the AMPV, the CAPE ICE was delayed in order to include the results of the final contract negotiations and contract definitization and approval of the Acquisition Program Baseline.

In addition to the cost assessment activities shown in Tables I and II, there were two CAPE cost assessments for classified programs, which are not discussed in this unclassified report.

Critical Unit Cost (Nunn-McCurdy) Breaches

There was one certification decision associated with a critical unit cost (Nunn-McCurdy) breach in FY 2023. Table 3 identifies the program name and acronym, the responsible DoD Component, the supporting cost estimate or analysis presented to the USD(A&S), and the date of the critical breach certification.

Descriptions of unit cost (Nunn-McCurdy) reporting and the certification process associated with unit cost breaches are provided in Appendix B.

Table 3. Nunn-McCurdy Critical Unit Cost Breach Certifications in FY 2023

Program Name	Acronym	DoD Component	Cost Assessment Activity	Activity Date	Supported Event	Event Date
MQ-4C Triton Unmanned Aircraft System	MQ-4C	Navy	CAPE Acquisition Cost Estimate December 2022 SAR	6/1/2023	Certification to Congress	6/9/2023

Remarks about Specific Programs

- The primary cause of the MQ-4C unit cost breach was the decision to reduce the quantity of aircraft procured, from 70 to 26. The reduction in quantity directly resulted in a critical unit cost breach to both the program acquisition unit cost and the average procurement unit cost.

Independent Cost Estimates for Sustainment Reviews

As noted in Chapter II, each sustainment review for a covered system is required to be supported by an ICE for the remainder of the life cycle of the program.

Based on lessons learned from the FY 2021 and FY 2022 sustainment reviews, CAPE issued a policy memo in November 2022 to provide guidance for conducting the FY 2023 sustainment reviews. In this memo, CAPE elected to delegate responsibility for all ICEs to the DoD Components. The DoD Components must conduct the ICE in accordance with guidance provided in DoD Instruction 5000.73, *Cost Analysis Guidance and Procedures*. Three programs (LPD-17 San Antonio Class Amphibious Transport Dock, C-17 Globemaster III, and the Minuteman III) were deemed high interest and required close coordination with CAPE on developing the ICE.

Table 4 summarizes the 18 ICEs prepared for sustainment reviews in FY 2023.

Table 4. ICEs in FY 2023 for Sustainment Reviews

Program Name	DoD Component	ICE Date	Review Date	Critical O&S Growth
Palletized Load System	Army	11/3/2022	11/16/2022	
Heavy Expanded Mobility Tactical Truck	Army	11/7/2022	11/16/2022	Yes
Stryker Family of Vehicles	Army	1/30/2023	2/16/2023	Yes
Heavy Equipment Recovery Combat Utility Lift And Evacuation System	Army	3/14/2023	3/17/2023	Yes
Thermal Weapon Sight	Army	4/5/2023	4/13/2023	
Family of Medium Tactical Vehicles	Army	4/19/2023	5/4/2023	Yes
MQ-1C Gray Eagle	Army	5/11/2023	5/30/2023	Yes
High Mobility Artillery Rocket System	Army	6/22/2023	6/5/2023	
AN/TPQ-53 Counterfire Radar	Army	6/22/2023	6/28/2023	
Javelin Anti-tank Missile	Army	7/21/2023	6/8/2023	Yes
Joint Air-to-Surface Standoff Missile	Air Force	6/29/2023	7/24/2023	
C-17 Globemaster III	Air Force	7/17/2023	7/20/2023	
Wideband Global Satellite Communications	Air Force	7/27/2023	8/11/2023	
Minuteman III (LGM-30G)	Air Force	9/11/2023	9/27/2023	
P-8A Poseidon	Navy	6/11/2023	8/1/2023	
MH-60R Seahawk	Navy	6/13/2023	6/14/2023	
MH-60S Seahawk	Navy	6/13/2023	6/14/2023	Yes
AIM-9X Block II Sidewinder Missile	Navy	6/14/2023	6/12/2023	

Medium Tactical Vehicle Replacement	Navy	8/8/2023	8/22/2023	
LPD-17 Amphibious Transport Dock	Navy	10/24/2023	8/29/2023	Yes

In addition to the ICEs noted in Table 4, CAPE also began its own ICE for the sustainment review of the SSN-774 Virginia class submarine.

During the FY 2023 sustainment reviews, CAPE and the military departments emphasized assessing the accuracy and completeness of the historical cost data and, for any deficiencies, identifying and addressing needed data improvements as part of the EVAMOS initiative. In addition, they emphasized identifying any gaps in cost data for contractor logistics support, and determining additional contracts that will need to be included as part of CSDR reporting. CAPE is now preparing a Sustainment Review Guidebook that will provide direction to the DoD Components for future sustainment reviews.

A listing of the prior sustainment reviews held in FY 2021 and FY 2022 is provided in Appendix H. Over the period FY 2021 through FY 2023, there have been a total of 52 sustainment reviews, of which 15 identified critical O&S cost growth.

CAPE Cost Analysis for Multiyear Procurement

As noted in Chapter II, CAPE conducts a cost analysis of a proposed MYP strategy prior to contract award to determine if the MYP contract would result in substantial savings. In addition, CAPE continues to conduct earlier preliminary cost analyses to support a DoD decision to pursue such a MYP strategy, even though the preliminary CAPE cost analysis is no longer required by statute.

Table 5 summarizes the CAPE estimates of savings for MYP contract awards in FY 2023. The table also identifies the program name and acronym, the responsible DoD Component, the CAPE supporting cost estimate of MYP savings, and the event being supported, if applicable.

Table 5. Cost Analyses in FY 2023 for Multiyear Procurement Contract Awards

Program Name	Acronym	DoD Component	Cost Assessment Activity	Activity Date	Supported Event	Event Date
AH-64E Apache Helicopter	AH-64E	Army	CAPE Updated Estimate of Savings for MYP Contract	1/25/2023	MYP Contract Award	3/17/2023
Virginia Class Submarine	SSN-774	Navy	CAPE Preliminary Estimate of Savings for MYP Contract	4/12/2023	N/A	N/A
DDG 51 Arleigh Burke Class Destroyer	DDG 51	Navy	CAPE Updated Independent Estimate of Savings for MYP Contracts	5/23/2023	MYP Contract Awards	8/1/2023
Standard Missile 6 Block IA	SM-6 IA	Navy	CAPE Preliminary Estimate of Savings for MYP Contract	6/27/2023	N/A	N/A
Joint Air-to-Surface Standoff Missile/Long-Range Anti-Ship Missile	JASSM/LRASM	Air Force/ Navy	CAPE Preliminary Estimate of Savings for MYP Contract	7/6/2023	N/A	N/A
Advanced Medium-Range Air-to-Air Missile	AMRAAM (AIM-120)	Air Force	CAPE Preliminary Estimate of Savings for MYP Contract	7/20/2023	N/A	N/A

Table 6 shows the historical experience for MYP savings (relative to single-year procurement (SYP)) for 17 aircraft and missile MYP contracts from 2010 through 2023.

Table 6. CAPE Estimated MYP Savings – Aircraft and Missile Contracts

Program	CAPE SYP Estimate (Then-Year \$B)	Savings – CAPE SYP vs. Negotiated Price (%)	Savings – CAPE SYP vs. Negotiated Price (Then-Year \$B)
F-18 MYP 3	5.88	10.2	0.60
H-60 Airframe MYP 8	8.95	18.1	1.62
H-60 Avionics	1.55	19.4	0.30
CH-47F MYP 2	4.22	19.2	0.81
V-22 MYP 2	7.24	11.6	0.84
E-2D MYP 1	5.22	15.9	0.83
C-130 MYP 2	6.00	11.5	0.69
AH-64E MYP 1	3.14	10.5	0.33
H-60 Airframe MYP 9	3.72	13.7	0.51
V-22 MYP 3	4.35	12.4	0.54
F-18 MYP 4	3.77	10.3	0.40
E-2D MYP 2	3.88	10.0	0.37
SM-6 MYP 1	3.11	10.3	0.32
C-130 MYP 3	3.94	10.9	0.43
SM-3 Block IB MYP 1	2.42	13.2	0.32
H-60 Airframe MYP 10	2.69	14.5	0.39
AH-64E MYP 2	1.91	10.2	0.19

The MYP percentage savings for these aircraft and missile contract awards have ranged from roughly 10 to 19 percent. The estimated total savings for these contracts is estimated to be \$9.5 billion in then-year dollars.

Table 7 shows the historical experience for MYP savings for four ship MYP contracts from 2012 to 2019.

Table 7. CAPE Estimated MYP Savings – Ship Contracts

Program	CAPE SYP Estimate (Then-Year \$B)	Savings – CAPE SYP vs. Negotiated Price (%)	Savings – CAPE SYP vs. Negotiated Price (Then-Year \$B)
DDG 51 MYP 3	7.22	9.0	0.65
VCS SSN 774 MYP 3	21.85	20.0	4.37
DDG 51 MYP 4	10.29	6.9	0.71
VCS SSN 774 MYP 4	26.47	6.8	1.80

The MYP savings for the ship contract awards range from roughly 7 to 20 percent. Although the ship MYP savings tend to be less in percentage terms compared to the MYP savings for aircraft and missiles, they are nevertheless significant in total dollar terms. The overall total savings for these contracts is estimated to be roughly \$7.5 billion in then-year dollars.

Assessment of Cost Estimation Compliance, Quality, and Accuracy

Since the enactment of WSARA in May 2009, CAPE, in partnership with the entire DoD cost community, has worked to improve the quality and accuracy of life-cycle cost estimates for MDAPs and other acquisition programs; this section provides metrics to measure the results.

Compliance with Policy and Procedures

Appropriate cost estimates or analyses that complied with the requirements of statute and the established cost assessment procedures described in Chapter II supported all of the events noted in Table 1 through Table 5. In particular, each MDAP milestone or other acquisition review decision (noted in Table 1 and 2) was supported by (1) a CCP and (2) an ICE conducted or approved by CAPE. Each critical unit cost breach certification (noted in Table 3) was supported by an ICE, as was each sustainment review (noted in Table 4). In addition, for each MYP contract award (noted in Table 5), CAPE provided an independent estimate of MYP cost savings. Information about the compliance of CSDR data reporting is provided in Appendix E.

Quality of the Cost Estimates

The overall quality of the cost estimates from each of the military departments has continued to improve due to increased rigor. As noted in Chapter II, DoD has instituted a policy—in place since 2009 for all MDAPs—requiring that a signed, dated DoD Component cost estimate and a CCP be delivered to CAPE prior to delivery of an ICE, to support each milestone or other DAB review. Also, the military department’s financial and acquisition leadership must provide a statement with the CCP affirming the military department’s commitment to fully fund the program during the preparation of the next Program Objective Memorandum (POM) and the President’s Budget FYDP.

The quality of the cost estimates for MDAPs provided by the military departments and by CAPE also has continued to improve due to better data. An increased, Department-wide emphasis on the importance of cost data reporting has resulted in significant increases in the quantity and frequency of cost data reports compared to the acquisition reform era of the 1990s. Figure 2 shows the annual volume of CSDR data reports for each of the major system commodities.

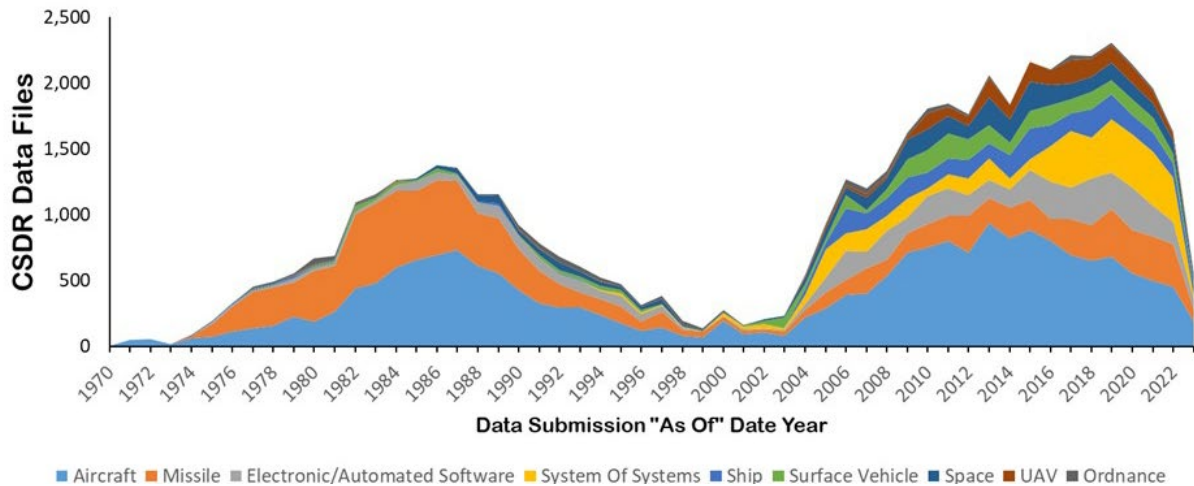


Figure 2. CSDR Data Collection over Time

Note that Figure 2 shows the CSDR reporting based on the “as of” date, not the submission date. For example, a report with an as-of date of December 2023 typically will be submitted in February 2024. As a result, the last year of the figure has an apparent drop-off in reporting because not all of the 2023 reports had been submitted by the publication date of this report.

The emphasis on better data extends beyond the volume of reports; Chapter IV describes additional ongoing efforts to improve the content and quality of the specific data reports.

Differences in Methodologies

Since the enactment of WSARA, differences in methodologies or approaches between the cost estimates prepared by the military departments and by CAPE have decreased over time. Generally, the approaches used by the military departments and CAPE now follow similar best practices in cost estimation, which entail (1) collecting actual cost information from ongoing and historical programs in a product-oriented taxonomy; (2) using that information to prepare cost and schedule forecasts for new programs or programs proceeding to the next milestone in the acquisition process; and (3) reviewing the actual cost information collected, as each individual program proceeds, to update and adjust the cost and schedule forecasts for the program to reflect actual experience. As discussed in the previous section, the Department’s goal has been to improve the systematic collection of actual cost information over time and ensure the data are available to all DoD organizations. This approach has resulted in smaller differences between the cost and schedule forecasts of the military departments and CAPE.

An annual CAPE analysis compared the CAPE ICEs and the CCPs and found that since the enactment of WSARA, the difference between the two estimates had narrowed significantly relative to the previous period between 1999 and the enactment of WSARA. The difference is calculated as the percentage amount that the CAPE ICE exceeds the CCP. Figure 3 shows the most recent results of this comparison.

Differences between CAPE ICE and CCP

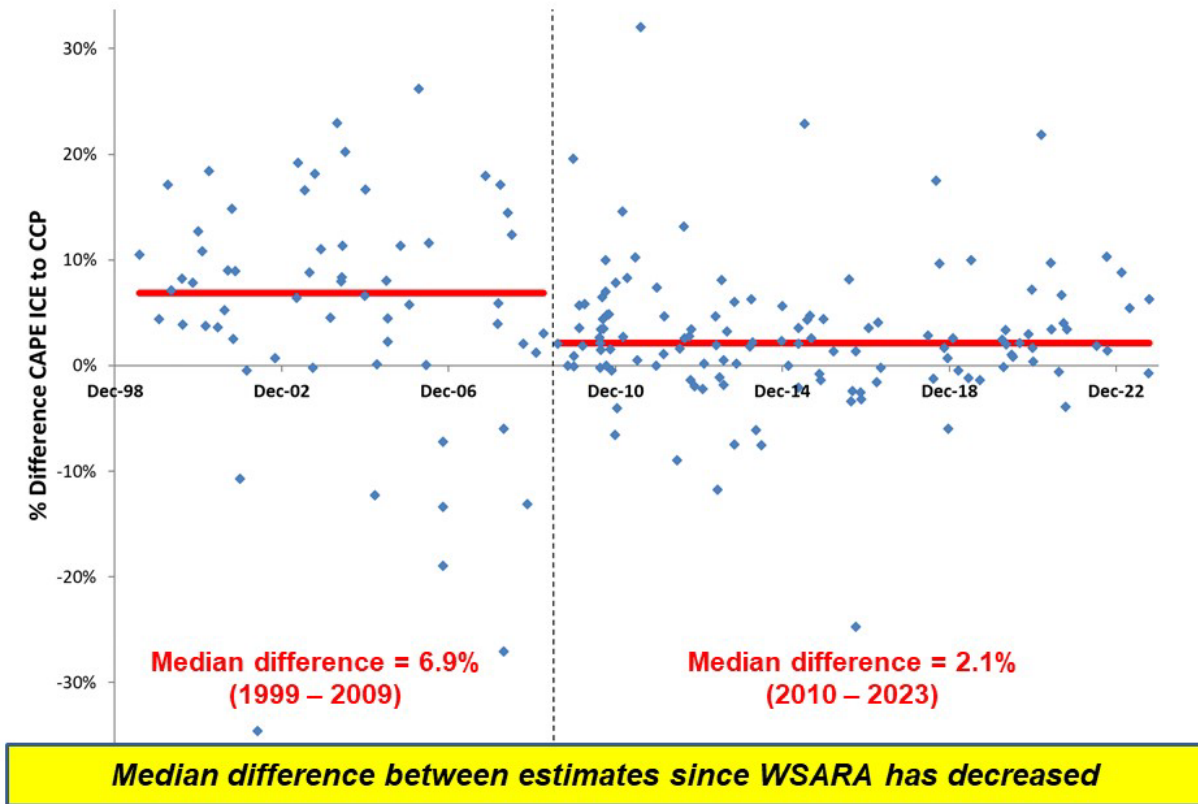


Figure 3. Comparison of CAPE ICEs to DoD Component Cost Positions

Since the enactment of WSARA, the median difference is 2.1 percent, compared to a median difference of 6.9 percent for the previous period. In addition, the statistical variances have significantly narrowed, meaning that the post-WSARA estimates are more tightly clustered, showing that the CCPs and CAPE ICEs are now more closely aligned. Despite this narrowing of differences, some outliers have indicated significant discrepancies (greater than 10 percent) between the CCP and the CAPE ICE. In these situations, CAPE and the military department cost agency meet to assess the reasons for the discrepancy and determine whether better data are available to reconcile the difference. Failing that, CAPE and the military department work together to assess how costs can be controlled as the program moves forward.

Nunn-McCurdy Unit Cost Breaches

One simplistic measure of acquisition program cost performance that pertains to cost growth is the annual rate of Nunn-McCurdy unit cost breaches that have occurred over time. Figure 4 shows the number of significant and critical breaches by Selected Acquisition Report (SAR) reporting year from 1997 through 2022.

Nunn-McCurdy Breaches (1997-2022)

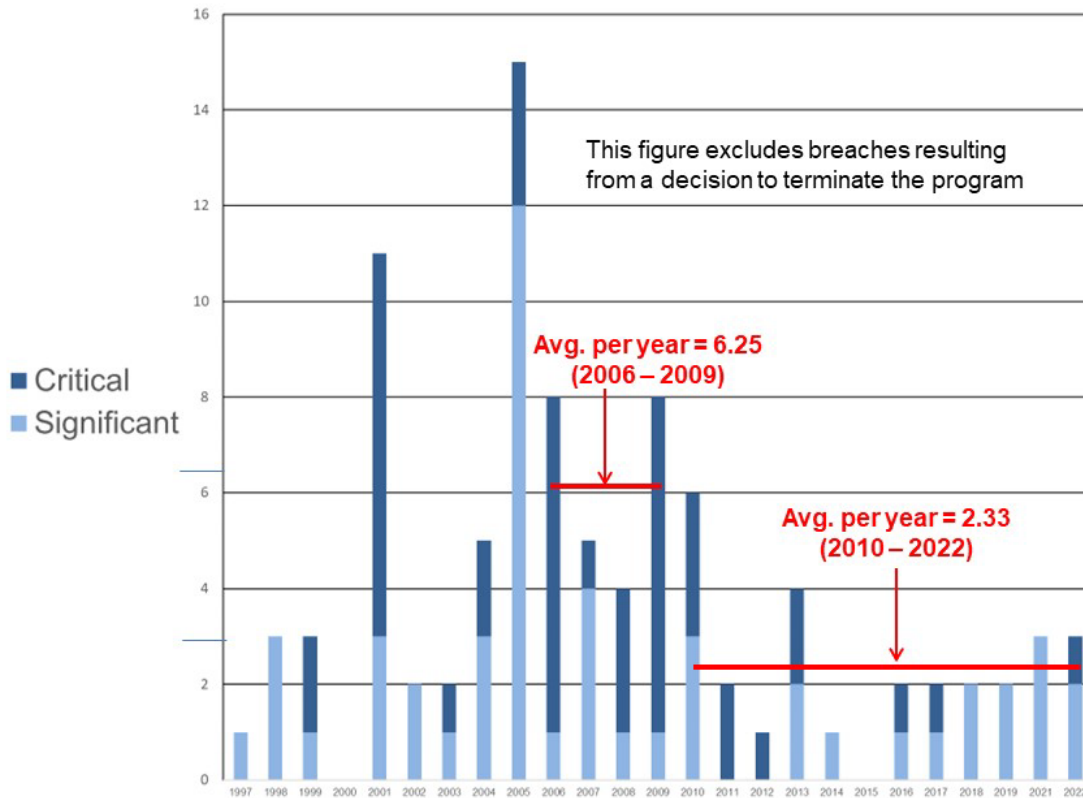


Figure 4. Number of Nunn-McCurdy Breaches by SAR Reporting Year

It is important to note that the NDAA for FY 2006 changed the criteria for a Nunn-McCurdy breach by adding a requirement to report unit cost growth from the original program baseline as well as the current (possibly revised) baseline. This requirement caused a large spike in 2005, when 11 programs had to report preexisting significant breaches. Thus, for historical comparisons, the period before 2006 is not comparable to the period after that. For the more recent period, the average annual number of breaches has declined since the enactment of WSARA in 2009.

SAR reporting is required for MDAPs beginning with Milestone B approval until the program has completed 90 percent of the expected production deliveries and until 90 percent of the planned acquisition expenditures have been made. The period from 2006 through 2009 averaged 95 SAR reporting programs that experienced an average of 6.25 breaches per year. The period from 2010 through 2022 averaged 82 SAR reporting programs that experienced an average of 2.33 breaches per year. Adjusting the number of breaches per year from 2010 through 2022 for difference in SAR portfolio size would bring the average number of breaches per year to 2.73. Even with this adjustment, the number of breaches per year has declined since the enactment of WSARA in 2009.

Program Acquisition Unit Cost Performance

It is also possible to measure the acquisition cost growth that can occur between the cost estimate at Milestone B and the actual cost outcome when the program is completed or is sufficiently mature and stable that the expected cost is reasonably certain.

Program acquisition unit cost (PAUC) is a common cost metric that is used to measure acquisition cost growth. For this analysis, PAUC is measured as the total program acquisition cost (the sum of research, development, test and evaluation (RDT&E) and procurement costs) divided by the total program quantity of systems (i.e., fully configured end items from development and production).⁵ PAUC is normally tracked in constant dollars of a base year established for each program. Additional details about PAUC are provided in Appendix B.

The measurement of acquisition cost growth is the percentage increase (or decrease) in PAUC between the Milestone B cost estimate (and approved baseline) and the actual acquisition cost outcome. However, it is quite common for many programs to experience changes in approved quantities from the time of Milestone B due to changes in DoD priorities and requirements. These changes distort the measurement of acquisition cost growth; therefore, the assessment presented in this section is PAUC *adjusted for quantity*. Specifically, the Milestone B PAUC baseline is recalculated using the final (or most recently approved) program quantity. This recalculation has two effects. First, the program RDT&E costs are amortized over a different program quantity, changing the PAUC baseline. Second, the baseline procurement costs are adjusted for any appropriate “learning curve” (more formally known as the cost progress curve) unique to each program. Each cost progress curve was derived using the SAR procurement unit cost and quantity data for each production lot.

Figure 5 displays the percentage acquisition cost growth for 43 MDAPS that received Milestone B approval between 2000 to 2017.

⁵ This analysis omits military construction costs and acquisition-related operations and maintenance costs from the calculation of PAUC. These two elements are small percentage-wise, and there are no widely accepted methods for adjusting these costs for changes in program quantity (which is critical to this analysis).

MDAP Acquisition Cost Growth from MS B (Program Acquisition Unit Cost (PAUC) Adjusted for Quantity)

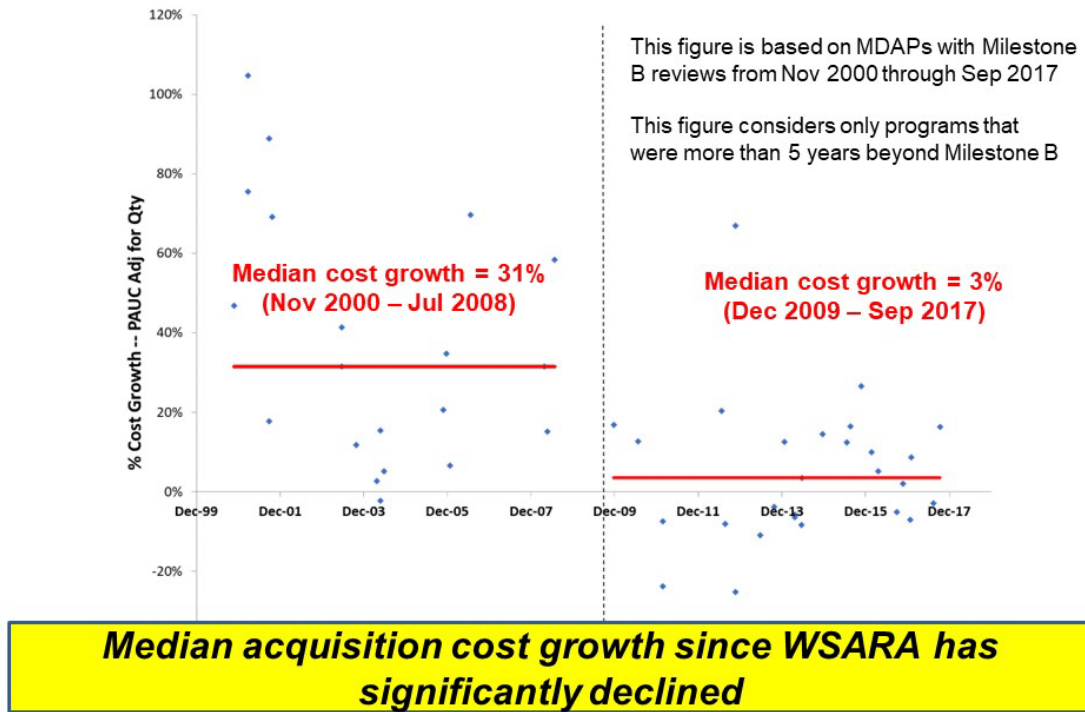


Figure 5. MDAP Acquisition Cost Growth from Milestone B

The PAUC baseline that was approved at Milestone B (adjusted for quantity) is compared to the current estimate of PAUC in the program December 2022 SAR or the final program SAR for programs that were completed before 2022. The criterion in this assessment is to include only programs that are currently more than 5 years beyond the time of Milestone B approval, at which point the acquisition costs are assumed to be fairly stable.

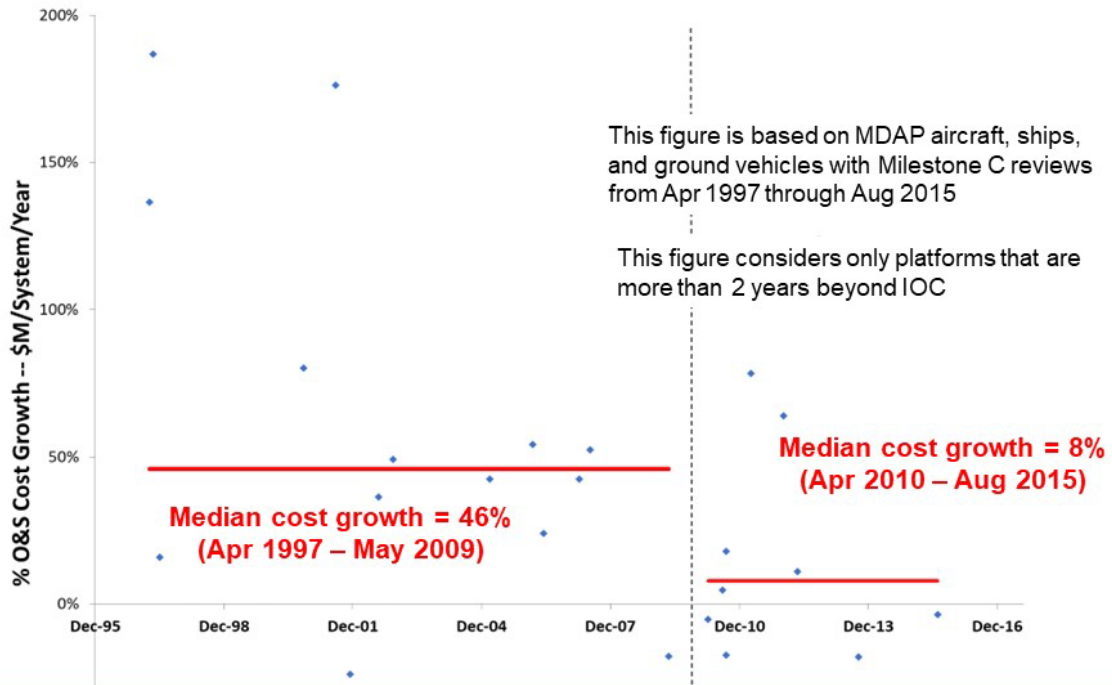
For the period (November 2000 through July 2008), before the enactment of WSARA in 2009, the median cost growth in PAUC—adjusted for quantity—was 31 percent. For the period (December 2009 through September 2017), since the enactment of WSARA, the median cost growth in PAUC—adjusted for quantity—was 3 percent.

These cost growth observations are not symmetrical, but are skewed to the right. As a result, the average cost growth for each period is larger than the median. The average cost growth for the pre-WSARA period was 37 percent, and the average cost growth for the post-WSARA period was 5 percent.

Program Operating and Support Unit Cost Performance

For certain types of programs (platforms such as aircraft, ships, and ground vehicles), the system O&S cost is usually the largest element of life-cycle cost. CAPE efforts to improve cost estimates for MDAPs since WSARA have also addressed system O&S costs. Figure 6 displays the percentage O&S cost growth for 24 platforms that received Milestone C approval between 1997 and 2015.

Major Platform O&S Cost Growth from MS C (\$M/System/Year)



Median platform O&S cost growth since WSARA has significantly declined

Figure 6. Major Platform O&S Cost Growth from Milestone C

The figure compares the O&S cost baseline that was approved at Milestone C to the latest available O&S cost estimate for the program. The O&S cost is measured as \$ million/system/year, which is the annual O&S cost divided by the quantity of platform end items. For 12 of these programs, the latest estimate is the sustainment review ICE (as discussed earlier in this chapter). For the remaining 12 programs, the most recent cost estimate is provided in the December 2022 SAR or the final program SAR for programs that were completed before 2022. The criterion in this assessment is to include only programs that are currently more than 2 years beyond the time of IOC, at which point it is assumed that the system O&S costs are fairly certain.

For the period (April 1997 through May 2009), before the enactment of WSARA in 2009, the median system O&S cost growth was 46 percent. For the period (April 2010 through August 2015), since the enactment of WSARA, the median system O&S cost growth was 8 percent. The average cost growth for the pre-WSARA period was 61 percent, and the average cost growth for the post-WSARA period was 26 percent.

Other Cost Assessment Activities

Other Cost Estimates and Analyses

CAPE completed an ICE and comprehensive assessment of three options for the F-35 fighter engine (known as the F135). The three options considered were (1) continued utilization of the current engine; (2) an upgraded F135 engine incorporating a new core design resulting from the Engine Core Upgrade program; and (3) a replacement engine based on the technologies developed under the Adaptive Engine Transition Program. This report, which was required by the House Committee Appropriations Report accompanying the FY 2023 Appropriations Act, was provided to the congressional defense committees in April 2023.

On September 15, 2021, Australia, the United Kingdom, and the United States announced a trilateral security agreement (referred to as AUKUS) concerning the collaborative development and delivery of a conventionally-armed, nuclear-powered attack submarine capability. At this time, the three nations embarked on an 18-month consultation period to identify the optimal pathway for Australia to acquire this capability and to enhance the submarine industrial bases of all three nations. Concurrently, in support of the FY 2023 DoD Program Budget Review, CAPE conducted a review (known as SIB-23) focusing on elements of the submarine industrial base that support new construction. CAPE also provided cost assessments for examining a full range of investment opportunities. Subsequently, in support of the FY 2025 DoD Program Budget Review, CAPE conducted a joint study (known as SIB-25) with the U.S. Navy to identify investment opportunities within the U.S. submarine industrial base to deliver submarines to Australia, upgrade infrastructure and industrial capacity, and enhance the maintenance and sustainment of submarines. The CAPE/Navy team conducted site visits to suppliers, shipbuilders, and sustainment organizations to learn about the challenges they face with the supply chain, infrastructure, and work force, and to identify investment opportunities to leverage advanced technologies to improve outcomes in new construction and sustainment. SIB-25 was completed in January 2024.

In the summer of 2022, in support of the FY 2024 DoD Program Budget Review, CAPE prepared an independent estimate of the development cost of the Missile Defense Agency program known as the Glide Phase Interceptor (GPI) program. GPI is an important element of the missile defense portfolio for defending against hypersonic missiles. The hypersonic interceptors will fire from the vertical launch systems of U.S. Navy surface warships and engage and destroy incoming hypersonic missiles as they glide through the boundary between space and Earth's atmosphere (the most vulnerable phase of flight). CAPE updated the estimate for the GPI development program in June 2023 to incorporate changes to the planned development schedule and acquisition strategy made by the Missile Defense Agency after the original CAPE 2022 estimate. The updated cost estimate also reflected recent changes in missile design and other technical program information from the contractor teams.

CAPE made an estimate of the cost savings for using block buy contracts for the CH-53K airframe and the CH-53K T408-GE-400 engine. A block buy procurement uses an economic order quantity contracting strategy. The CAPE estimate was made to support a USD(A&S) certification of savings provided to the congressional defense committees as required by Section 127 of the NDAA for FY 2023.

CAPE completed an independent life-cycle cost estimate of the Resilient Missile Warning and Missile Tracking program in August 2023. This U.S. Space Force program observes low earth and medium earth

orbits, detecting and tracking hypersonic missiles and other threats. This CAPE cost estimate was required by the Consolidated Appropriations Act, 2023. The CAPE ICE report was provided to the congressional defense committees in September 2023.

Section 830 (Modification of Requirements for Reporting to Congress on Certain Acquisition Programs) of the NDAA for FY 2020 required DoD to propose an alternative method for reporting the status for MDAPs and acquisition programs that use alternative acquisition pathways or tailored acquisition procedures. More recently, Section 805 (Two-Year Extension of Selected Acquisition Report Requirement) of the NDAA for FY 2022 expanded upon the earlier Section 830 and called for CAPE to prepare a plan for identifying and gathering the data required for effective decision-making by program managers and DoD leadership regarding the reporting programs. Section 805 also tasks OUSD(A&S) with implementing the plan. CAPE provided its initial findings to USD(A&S) on July 8, 2022, and CAPE provided its final recommendations to USD(A&S) in January 2023. CAPE also worked with USD(A&S) on the final implementation plan for DoD's Modernized Selected Acquisition Report (MSAR) process that was issued in June 2023. The official MSAR policy and procedures will be included in the next update to DoDI 5000.85, *Major Capability Acquisition*.

DoD Cost Analysis Symposium

For several decades, CAPE and its predecessor organization have sponsored an annual DoD Cost Analysis Symposium (DoDCAS), with attendees drawn primarily from government and private-sector cost research and analysis organizations. DoDCAS provides a valuable forum for education, training, and improvement of communication within the DoD cost analysis community. The presentations at DoDCAS facilitate discussion, instruction, and debate concerning cost estimating methods and models, data collection, and contemporary issues of interest to the DoD cost community. In this way, the event leverages the knowledge and experience of the community to increase individual and collective expertise in cost estimation and analysis. DoDCAS also provides members of the DoD cost community the opportunity to hear the insights of senior DoD and other government officials on important topics.

The COVID-19 pandemic prevented DoD from holding a traditional symposium event. In the interim, CAPE held community-wide virtual meetings.

In November 2023, CAPE held its third annual two-day Cost and Technical Focus Group session. The purpose of the Focus Group was to promote discussion within the cost estimating and cost reporting communities to improve the quality and efficiency of CADE and the CSDR reporting system. The first day was a joint government-industry meeting that considered ways to improve the efficiency of the cost reporting process and the associated formats. This meeting was attended by 123 persons (either in-person or virtually). The second day was a government-only session where the cost estimating community could provide feedback from the users of the data; 98 persons attended this meeting.

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CHAPTER IV. THE LOOK FORWARD

CAPE has worked with the military department cost agencies and other organizations to strengthen the institutions of the DoD cost analysis community. However, work continues toward meeting DoD's evolving needs and new legislative requirements. This chapter discusses the ongoing status of several key initiatives and future plans that comprise this reform effort.

Cost Leadership Forum

The CAPE Deputy Director for Cost Assessment holds periodic meetings (known as the Cost Leadership Forum) with the leaders and senior staff of the military department cost agencies to discuss issues of common interest to the cost analysis community. The intent of these meetings is to establish greater collaboration among CAPE and the military department cost organizations by sharing analytic best practices. These meetings, which currently are held virtually each month, aim to help develop a collective vision of the community's path forward for the next 5 years in meeting agreed-to strategic objectives, improving cost analysis, and improving business processes. The leadership also addresses issues in workforce management due to significant increases in the workload for the cost community as a result of the new acquisition pathways and expanded congressional requirements. In addition, key members of the Forum serve as the CADE Board of Directors, which also meets monthly. CAPE also co-chairs the Collaborative Cost Research Group that coordinates cost research activities.

Policies and Procedures

For several years, CAPE and the military department cost agencies have worked together to update cost assessment policies and procedures to keep them up to date and responsive to evolving legislative requirements. The CAPE cost assessment guidance documents are described in Chapter II and Appendix C. Appendix F describes recent legislative changes to statutory requirements for defense acquisition that have been addressed in acquisition and cost assessment policy and procedures.

DoD Instruction 5000.73 is now being revised, mostly for clarifications and fact-of-life changes. The revision also will provide guidance for program cost estimates before any decision to award a contract for a major military construction project.

On the basis of lessons learned from the FY 2021 and FY 2022 sustainment reviews, CAPE issued a policy memo in November 2022, "Cost Estimating, Document Collection, and Data Reporting for Fiscal Year 2023 Sustainment Reviews." This guidance document is described in Chapter III.

Enhanced Cost Data Collection

FlexFile Initiative

Until recently, CSDR data were collected in legacy report formats, similar to those first created in the 1960s. Some contractors had to manually allocate their costs from their financial and other accounting systems into these formats. CAPE partnered with the military department cost agencies to commission a government team to work with industry. The goal of this partnership was to improve data quality and enable the submission of monthly low-level cost data directly from contractors' accounting systems while retaining visibility into the standard government cost elements and categories. The resulting

transformation, which is the next generation of collecting cost data, has improved data quality, reporting compliance and timeliness, and reduced the reporting burden on contractors. This change also provides analysts with more flexibility in using the data in cost estimates. This initiative is known in the cost analysis community as the Cost and Hour Report (FlexFile).

CAPE issued a policy memo in March 2019 to mandate the use of FlexFile reporting on all new contracts beginning in May 2019. The most recent CAPE guidance on FlexFile reporting was provided in the CSDR Manual (DoDM 5000.04) described in Appendix C. CAPE also published a FlexFile Implementation Guide in November 2023 that provides assistance in CSDR planning and FlexFile reporting. Training on FlexFile reporting for both government and industry personnel is described later in this chapter.

Additional information on the FlexFile initiative is available on the CADE public website at <https://cade.osd.mil/policy/flexfile>.

The projected transition from the legacy CSDR submissions (1921 series) to Flexfile reporting is shown in Figure 7.

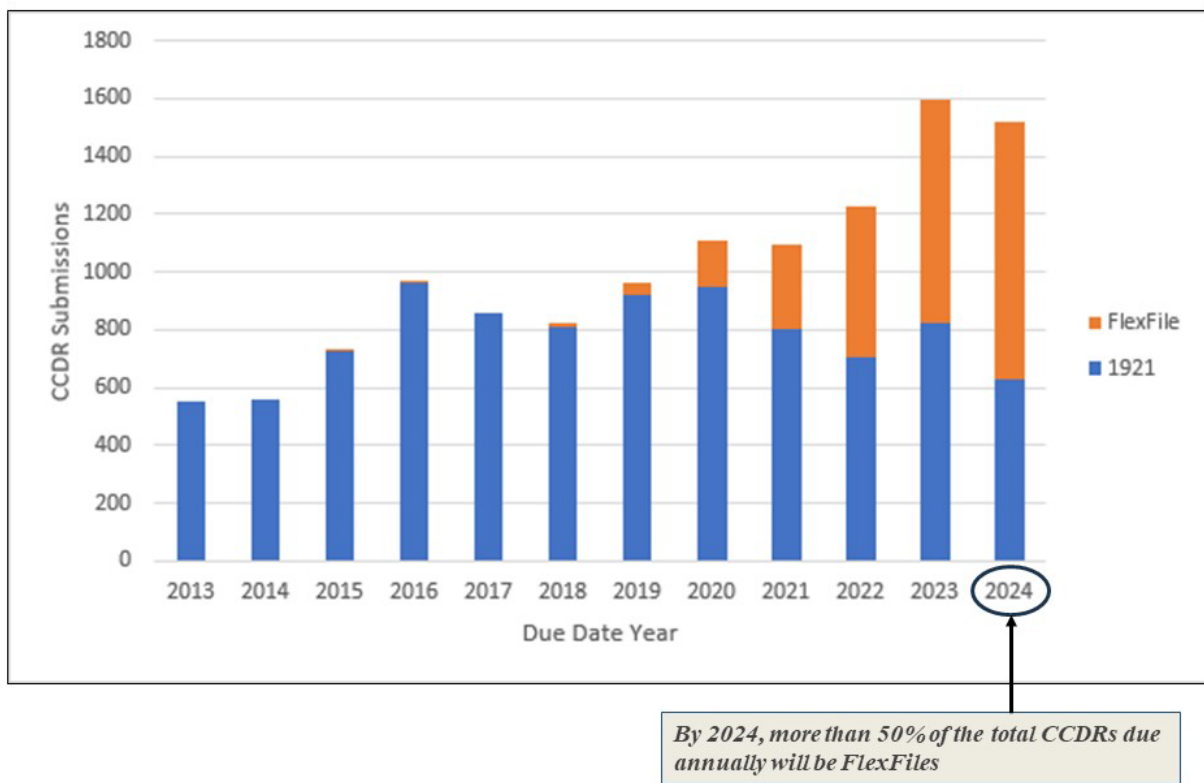


Figure 7. FlexFile versus Legacy (1921) Submissions

Formal implementation of FlexFile reporting began in 2019, and has seen rapid growth; the number of FlexFile submissions increased tenfold from 2020 to 2023. Figure 7 shows submissions only for currently known contract efforts, which will change in the future. In particular, the dip in 2024 likely will not actually occur as more FlexFile plans for future contracts are expected to be approved.

Cost Analysis Education and Training

Training and Education for the Cost Community

CAPE leads the development of improved analytical skills and competencies for the DoD cost assessment workforce through formal training and continuous education. For the last several years, CAPE has led the review of the curriculum associated with DAU and other courses leading to professional certification and credentials in cost estimating, as established by the Defense Acquisition Workforce Improvement Act (DAWIA). In September 2020, USD(A&S) announced a significant streamlining of the DAWIA certification requirements for each acquisition workforce functional area, including Business-Cost Estimating. This streamlining initiative is known as Back-to-Basics (BtB) for the Defense Acquisition Workforce. As a result, CAPE and its cost training team led a major review that resulted in a redesign of the Business-Cost Estimating courses. This redesign includes education and training specific to CADE and its associated data that have been incorporated into the curricula at DAU, the Naval Postgraduate School (NPS), and the Air Force Institute of Technology (AFIT). FY 2023 marks the first full year that the revised BU-CE certification structure is in place, and CAPE continues to collect feedback in support of future improvements.

CAPE also maintains a dedicated CADE training team that provides a variety of virtual training courses each year. The team holds frequent webinars, virtual office hours, and other live events. CAPE established CADE Learn, a Learning Management System (LMS) on the web-based Bridge platform, which hosts all virtual and online training. CAPE planned and executed its annual Virtual Cost and Technical Focus Group, increasing the awareness of over 200 leading government professionals and industry partners concerning CADE policy updates and major initiatives. CAPE also solicited feedback and ideas on how to increase the efficiency and effectiveness of CSDR reporting. For the first time in 4 years, the Focus Group—held in Arlington, Virginia—returned to an in-person format.

A complete description of the BtB redesign and a review of the activities and accomplishments of the CADE training team in FY 2023 are provided in Appendix G.

Academic Degree Programs in Cost Analysis

In April 2011, CAPE supported the Navy and NPS in establishing an accredited master's degree program known as Master of Cost Estimating and Analysis (MCEA). This 2-year distance-learning program is a valuable element of the cost analysis community's education and helps improve cost estimates in both DoD and the defense industrial base. The program is part-time and consists of two courses per quarter for eight quarters and includes courses on cost estimating, probability and statistics, operations research, systems engineering, acquisition of defense systems, and financial management and budgeting. The program blends web-based online instruction with video-televised classroom education and is tailored to students whose careers do not allow them to participate in a full-time, traditional, on-campus program. In the final two quarters of the program, each student works on a capstone research project sponsored by a government organization in the cost analysis community. Tuition may be paid through the Defense Acquisition Workforce Development Account. The MCEA curriculum fulfills the education and training requirements for the DAWIA Business-Cost Estimating certification. The thirteenth MCEA cohort commenced in March 2023 and will graduate in March 2025. The fourteenth MCEA cohort commenced in March 2024 and will graduate in March 2026.

The Air Force has its own master's degree program in Cost Analysis at AFIT. This full-time, in-residence graduate program is open to military and civilian personnel. The program curriculum integrates a strong foundation in quantitative concepts and techniques with specific military cost-related topics to prepare students to contribute in a variety of complex and challenging roles in the global military arena. Besides the weapon system cost sequence, the curriculum includes courses in statistics, business and economics, risk and uncertainty analysis, systems engineering, maintenance and production management, and decision analysis.

Approved Estimate—Program/Budget Review and Acquisition

DoD's acquisition process is event-driven and episodic in nature, driven primarily by key milestones and other review events identified in statute and regulation. CAPE has adopted a more continual approach in following and tracking program performance, assessing updated cost and schedule estimates, and evaluating new program risks and issues as they are identified. As part of the Department's program and budget review process, CAPE—in conjunction with the military department cost agencies—reviews select acquisition program, including MTA programs. This review determines the source of the cost estimate supporting the military department's budget request for the program and ensures that the program remains fully funded. For the FY 2025 DoD Program Budget Review, CAPE reviewed 85 programs, accounting for over \$101 billion in FY 2025 funding, to ensure full-funding compliance.

Appendix A.

Cost Analysis Organizations in DoD

Independent Cost Assessment Organizations

Four key offices in DoD—one in OSD and three within the military departments—prepare independent cost estimates (ICEs) for defense acquisition programs. The office within OSD responsible for ICEs reports to DCAPE. Within the military departments, the offices report to their Assistant Secretary for Financial Management and Comptroller.

Office of the Secretary of Defense

Deputy Director for Cost Assessment

The CAPE Deputy Director for Cost Assessment prepares ICEs for MDAPs and other acquisition programs. In other cases, CAPE reviews and/or approves the cost estimates and cost analyses prepared by the DoD Component for MDAPs and other acquisition programs. The Deputy Director for Cost Assessment also provides leadership to the entire DoD cost analysis community with regard to workforce development and management, policy and procedures, cost data collection, cost analysis education and training, and cost research.

Department of the Army

Deputy Assistant Secretary of the Army for Cost and Economics

The Office of the Deputy Assistant Secretary of the Army for Cost and Economics (DASA-CE) is responsible for providing Army decision-makers with cost, performance, and economic analysis in the form of expertise, models, data, estimates, and analyses at all levels. DASA-CE develops ICEs and DoD Component cost analyses for Army systems in support of acquisition decisions and sustainment reviews. DASA-CE also chairs and oversees the Army Cost Review Board, which develops and approves the Army cost position for major acquisition programs and the Army cost estimate for MTA and software pathway programs. DASA-CE also reviews and validates business case analyses, economic analyses, and special cost studies of major weapon systems, force structure, and O&S costs. In addition, DASA-CE develops cost factors for installation base operations, civilian personnel, and weapon system utilization rates (such as vehicle miles per system per year) to support programming and budgeting.

Department of the Navy

Naval Cost Analysis Agency

The Naval Cost Analysis Agency (NCAA) advises the Secretary of the Navy, Chief of Naval Operations, and Commandant of the Marine Corps on cost and economic issues. NCAA leads the Department of the Navy cost community in issues of cost estimating policy and procedures. For MDAPS, NCAA is responsible for developing the Navy Cost Position when CAPE elects to prepare the ICE for the program. Otherwise, NCAA will conduct the ICE.

In March 2019, the Navy reorganized its cost analysis community and moved many responsibilities and resources away from the predecessor organization (the Naval Center for Cost Analyses (NCCA)) and to

the cost organizations of the Navy major system commands. In particular, the Navy removed responsibility for MDAP cost estimates from NCCA and renamed the group Naval Cost Division (NCD)/FMB-6. However, as a result of the DoD FY 2024 Program Budget Review, the Navy was directed to reestablish NCAA as the Navy military department cost agency beginning in March 2024.

Department of the Air Force

Deputy Assistant Secretary of the Air Force for Cost and Economics/Air Force Cost Analysis Agency

The office of the Deputy Assistant Secretary of the Air Force for Cost and Economics (SAF/FMC) consists of headquarters staff elements and the Air Force Cost Analysis Agency (AFCAA). SAF/FMC also serves as the executive director of AFCAA. SAF/FMC approves the Department of the Air Force (DAF) Service Cost Position for all major acquisition programs. AFCAA develops ICEs, non-advocate cost assessments, and recommended DAF cost positions of Air Force aircraft, space, weapons, command and control, nuclear, and information systems to support acquisition, programming, and budgeting decisions. This agency also develops annual estimates of aircraft cost per flying hour to support programming and budgeting decisions. In addition, AFCAA conducts and coordinates DAF cost research, methods, and tools. It also is responsible for collecting, processing, and publishing the Air Force Total Ownership Cost (AFTOC) data warehouse. The headquarters staff elements conduct non-advocate business case analyses, economic analyses, financial analyses and special cost studies supporting multiple DAF and DoD stakeholders; oversee financial performance of DAF non-appropriated fund activities and the DAF non-appropriated fund employee pension fund; monitor budget risk for major programs; and advocate for and manage the Air Force and Space Force cost analysis workforce, ranging from base to headquarters levels.

Additional Field-level Cost Organizations and Activities

The military departments and defense agencies have several field-level cost organizations, which are typically located at a major system command or product center such as the Naval Air Systems Command (NAVAIR) or the Space Force Space Systems Center (SSC). This section summarizes these important organizations.

Department of the Army

Beginning in FY 2021, the Army began moving cost support personnel from the Tank-Automotive and Armaments Command (TACOM) and the Aviation and Missile Command (AMCOM) cost analysis organizations to the Program Executive Officers (PEOs) and Program Management Offices (PMOs).

Communication-Electronics Command

The Communication-Electronics Command (CECOM) Cost and Systems Analysis Division provides cost estimation and analysis support to CECOM PEOs and their PMOs. This division provides several cost analysis services, including life-cycle cost estimating, earned value management (EVM), economic analysis, modeling and simulation, computer software and database support, and review and validation of business case analyses and other cost analyses.

Department of the Navy

Naval Air Systems Command

The NAVAIR Cost and Schedule Analysis Department provides a variety of cost analysis products and services. Primarily, it aims 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 conducting life-cycle cost estimates, the Cost Department supports source-selection cost evaluations, EVM analysis, cost research and databases, and various cost/benefit studies.

Naval Sea Systems Command

The Naval Sea Systems Command (NAVSEA) Cost Engineering and Industrial Analysis Division provides cost engineering and industrial base analysis for ships, ship-related combat systems, and weapons. This division also provides cost estimates to support the acquisition review process, including AoA studies. In addition, this division participates in contract proposal evaluations and the source selection process for builders and suppliers of ships and weapon systems. This division also conducts analysis and forecasting of labor, industrial, and technical trends as they affect the overall acquisition of ships, combat systems, weapons, and other equipment.

Naval Information Warfare Systems Command

The Naval Information Warfare Systems Command (NAVWAR) Cost Estimating and Analysis Division aids ACAT I program offices, performs an ICE for ACAT II programs prior to a Milestone B or C review, and reviews a program office cost estimate at the request of the PEO/C⁴I or PEO Space Systems. The division also provides more general cost analysis support to the PEOs, as needed.

Marine Corps Systems Command

The Cost Estimating and Analysis (CE&A) community is the Marine Corps Systems Command (MCSC) authority in the field of cost analysis. The CE&A community conducts and oversees the development of cost estimates and analyses for MCSC and related PEO weapons, information technology, and training systems programs. The community advises the Commander, MCSC, and related PEOs on the historic, current, and emerging trends in elements of cost estimating and analysis. The community works for the MCSC Commander as an agent that provides independent cost and analytical products to MCSC Portfolio Management Offices, PMOs and related PEOs. The community has four functional areas: Cost Estimating (CE), Contract Services Management (CSM), Integrated Program Management (IPM), and Studies and Analysis (S&A). CE includes analytical teams in direct cost support of the Portfolio Managers, Direct Reporting Program Manager, Training Systems, and related PEOs. CSM manages the Command's Services Requirements Review Board process and Program Management Tool submissions. IPM conducts Earned Value (EV) Management determination, EV and scheduling analysis, and scheduling. S&A is a general support studies team for conducting AoAs and other operations research studies and analyses.

Department of the Air Force

Air Force Life Cycle Management Center

The Air Force Life Cycle Management Center (AFLCMC) leads estimates for program milestone decisions, manages the annual cost estimate process, supports pre-award activities and source selections,

and participates in policy discussions, resulting in high-quality cost estimates and analysis across the Center.

Space Force Space Systems Center

The SSC Cost Estimating Division supports cost estimates and cost analyses associated with the United States Space Force and SSC's mission of satellite acquisition, launch, and control.

Air Force Sustainment Center

The Air Force Sustainment Center (AFSC) Cost Estimating Division supports cost estimates and cost analyses associated with the AFSC's mission to provide depot maintenance, supply chain management, and installation support to Air Force weapon systems.

Air Force Nuclear Weapons Center

The Air Force Nuclear Weapons Center (AFNWC) Cost Estimating Division supports cost estimates and cost analyses for all nuclear weapon system activities. The responsibilities of the AFNWC include acquisition, modernization, and sustainment of nuclear system programs for both DoD and the Department of Energy.

Other

National Reconnaissance Office

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

Defense Information Systems Agency

The Defense Information Systems Agency (DISA) Cost Analysis Branch prepares cost estimates for the development, procurement, and sustainment of automated information systems and information technology capabilities. The division also provides independent support for DISA business case analyses.

Missile Defense Agency

The Missile Defense Agency Director of Cost Estimating and Analysis (DOC) is responsible for ensuring the quality of cost estimates; providing direction on cost estimating processes; and working with the service cost organizations, CAPE, and the Government Accountability Office on all cost-related matters. In recent years, DOC has worked closely with CAPE on preparing cost estimates for Missile Defense Agency programs and responding to congressional and Missile Defense Executive Board inquiries and tasks. In addition, the Agency has established a policy to collect CSDR data for its high-cost programs. For such programs, the CSDR plans are subject to approval by CAPE.

Appendix B.

Unit Cost Reporting for Major Defense Acquisition Programs

Since 1982, Congress has required DoD to track and report on the unit cost for most major defense acquisition programs (MDAPs). The requirement for unit cost reporting may be waived if the program has not entered engineering and manufacturing development (EMD), a reasonable cost estimate has not been established for the program, and the system configuration is not well defined. The provisions of the law concerning unit cost reporting are found in 10 U.S.C. § 4372.

Two unit cost metrics are 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; procurement; military construction; and acquisition-related Operations and Maintenance (O&M) appropriations) divided by the total program quantity of fully configured end items from both the EMD and production and deployment phases. APUC is defined as the program procurement cost divided by the procurement quantity. Both unit cost metrics are tracked in constant dollars of a base year established for each program.

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

Table B-1. Unit Cost Breach Thresholds

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

Note that two degrees are associated with the severity of the unit cost breach. For significant unit cost breaches, the Department must notify Congress of the breach within 45 days of the unit cost report and submit a program Selected Acquisition Report (SAR) with additional, breach-related information. For critical unit cost breaches, in addition to notifying Congress and submitting the SAR, the Department is required to conduct a complete assessment of the program, led by the Under Secretary of Defense (Acquisition and Sustainment) (USD(A&S)), and determine whether the program should be terminated or continued. The Department is required to terminate the program unless a letter signed by USD(A&S), certifying that the program meets specific criteria established in law (10 U.S.C. § 4376), is submitted to Congress within 60 days of the SAR submission. Among other things, USD(A&S) must certify that the Director of Cost Assessment and Program Evaluation (DCAPE) has determined that the new unit cost estimates are reasonable.

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Appendix C.

Additional Cost Assessment Guidance and Procedures

This Appendix describes the Cost Assessment and Program Evaluation (CAPE) guidance documents and other procedures that augment the guidance in DoDI 5000.73, *Cost Analysis Guidance and Procedures*.

Cost and Software Data Reporting Manual

DoDM 5000.04, *Cost and Software Data Reporting*, serves as the primary requirements document for implementing the Cost and Software Data Reporting (CSDR) system to ensure reported data are accurate and consistent. This manual was updated and reissued in May 2021. The update's primary purpose was to provide implementation details concerning the latest cost data collection policies and requirements that were issued in the March 2020 revision to DoDI 5000.73. This update incorporates previous requirements that were issued in earlier CAPE policy memos and provides for the expansion of CSDR reporting from new sources, including government-performed efforts, indefinite delivery/indefinite quantity (ID/IQ) contracts, Acquisition Category (ACAT) II programs, and MTA and other programs. The manual also provides the most recent guidance on FlexFile reporting. This instruction is available on the Executive Services Directorate website at <https://www.esd.whs.mil/DD/>.

Inflation and Price Escalation

Section 3221 of Title 10, U.S.C., requires that CAPE periodically assess and update the cost indices used by the Department of Defense (DoD) to ensure that such indices have a sound basis and meet the Department's needs for realistic cost estimation. Based on several studies, which were described in earlier editions of this report, the current practice in the DoD cost analysis community now distinguishes between inflation and price escalation.

Inflation refers to an increase in the general price level across the *economy as a whole*. To account for inflation in budgeting and cost estimates, each year the Under Secretary of Defense (Comptroller) issues inflation guidance derived from forecasts made by the administration and issued by the Office of Management and Budget (OMB).

Price escalation refers to changes in prices of a *specific good or service*. Escalation accounts for not only inflation, but also any real price change experienced in a specific industry or commodity group. Escalation may also account for any real price change that is associated with a specific contractor, such as in costs of direct labor or overhead.

The cost analysis community considers both inflation and appropriate escalation indices in cost estimates to be a best practice. This approach provides the most realistic forecast of future prices, considering specific markets, products, and contractors. To institutionalize this practice throughout the Department, CAPE most recently published *Inflation and Escalation Best Practices for Cost Analysis: Analyst Handbook*, in December 2021. This handbook supersedes two prior publications: *Inflation and Escalation Best Practices for Cost Analysts* (April 2016), and *Inflation and Escalation Best Practices for Cost Analysis: Analyst Handbook* (January 2017).

The most recent handbook is a more in-depth document explaining specific processes, computations, and data sources that analysts can use to prepare and document inflation and price escalation in cost estimates. The handbook was also updated to clarify terminology and provide more step-by-step instructions. The information in this handbook is not only important to cost estimates of weapon systems but also applicable to general programming and budgeting.

The handbook is available on the CAPE public website (<https://www.cape.osd.mil>) at “Public Reports.”

DoD Cost Estimating Guide

In January 2022, CAPE issued the *DoD Cost Estimating Guide (v2.0)*, which is an update to the guide previously published in January 2021. This guide is intended to be useful to all cost analysts, from novices to seasoned veterans. The guide provides important background information, including a review of relevant policy established in statutes and instructions, and explains standard cost terms and definitions. The guide also takes the reader through each critical step in the cost estimating process: (1) program definition; (2) cost estimate planning; (3) identification, collection, and validation of data; (4) selection of estimating methods and models; and (5) documentation and presentation of results. In addition, the guide provides an extensive list of references and relevant courses at Defense Acquisition University (DAU) and other institutions. The new version of the guide provides a case study demonstrating the cost estimating process using a notional program.

This guide is available on the Cost Assessment Data Enterprise (CADE) public website at <https://cade.osd.mil/policy/costestimating>.

Operating and Support Cost-Estimating Guide

Section 3221 of Title 10, U.S.C., requires that DCAPE issue guidance relating to full consideration of life-cycle management and sustainability costs in MDAPs and major subprograms. CAPE meets this requirement through publication of the *Operating and Support Cost-Estimating Guide*, which provides terms and definitions for the standard structure or taxonomy for operating and support (O&S) cost elements. The guide also summarizes the O&S cost data and related data systems available to the DoD cost analysis community, including contractor cost data reporting for major sustainment contracts. In addition, the guide provides a tutorial on best practices for planning, conducting, presenting, and documenting O&S cost estimates.

The guide was revised and reissued in September 2020. The revision added a discussion about a wide range of O&S metrics that are used by various DoD organizations for a variety of analytic purposes. The revision recommends an analytic approach that can be used to support sustainment reviews of major weapon systems after IOC. The guide also provides an example of an O&S cost estimate at the component or black box level of detail. In addition, the revision discusses the critical importance of product support during acquisition and provides a roadmap of the transition from the acquisition product support cost elements to the O&S cost elements.

This guide is available on the CADE public website at <https://cade.osd.mil/policy/os>.

Analysis of Alternatives Cost Estimating Handbook

The *Analysis of Alternatives Cost Estimating Handbook* provides guidance to cost analysts responsible for life-cycle cost estimates supporting analysis of alternatives (AoA) studies. The handbook provides an introduction and references to the existing material pertaining to life-cycle cost estimates but also provides material concerning issues on the comparative cost analyses unique to AoAs, such as the fully burdened cost of fuel. The handbook was issued in January 2022.

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

Cost Analysis Requirements Description

CAPE requires and provides guidance on the technical content and use of a document known as the Cost Analysis Requirements Description (CARD) that supports preparation of the CCP, the ICE, and other cost estimates as required. The CARD succinctly describes the key technical, programmatic, operational, and sustainment characteristics of an acquisition program. The foundation of a sound and credible cost estimate is a well-defined program, and the CARD provides that foundation. The CARD, along with supporting data sources, provides all of the information necessary to develop a cost estimate. By using the same CARD, various organizations preparing cost estimates for a program can develop estimates based on a shared understanding of program requirements and content.

The CARD format uses a narrative document augmented by a data template for collecting most technical data, such as programmatic information and design and performance parameters. The narrative, excluding tables and figures, should be approximately 20 pages long. Technical data are provided through standardized spreadsheet templates, known as CARD tables, that are specific to each weapon system commodity type (such as aircraft, ships, and missiles). Allowing program management offices to provide updates by revising only the program parameters that have changed from the previous submission minimizes the burden of CARD preparation. CARDS are stored in the CADE library, where they are available to CADE users.

Additional information about the CARD is available on the CADE public website <https://cade.osd.mil/policy/card>.

Cost Comparisons of Military, Civilian, and Contractor Manpower

CAPE revised DoDI 7041.04, *Estimating and Comparing the Full Costs of Civilian and Active Duty Military Manpower and Contract Support*, on July 1, 2020. This instruction establishes policy and provides procedures to estimate and compare the full costs of active duty military, DoD civilians, and contract support. The business rules, potential cost factors, and data sources provided in this instruction are used in cost-benefit analyses or business case analyses in support of workforce mix decisions. This instruction is available on the Executive Services Directorate website at <https://www.esd.whs.mil/DD/>.

To support the DoD users who need to perform the numerous calculations required by this instruction, CAPE has made available a web-enabled tool for estimating the full cost of

manpower (FCoM), which automatically calculates all cost elements required to maintain consistency with guidance in the instruction. The FCoM tool is available on the CADE public website (<https://cade.osd.mil>) at “Tools/Other Cost Tools” and is usable by all personnel who possess a valid common access card. The personnel cost factors for active duty military and civilian personnel have been updated to fiscal year (FY) 2023 rates. A classified version of the tool is available on the DoD Secure Internet Protocol Router Network (SIPRNet). The tool can be used for comparing the costs of military and civilian intelligence personnel as well as military and civilian manpower costs for developing and expanding the cyber workforce.

Economic Analysis for Decision-making

CAPE revised DoDI 7041.03, *Economic Analysis for Decision-making*, on October 2, 2017. This instruction is the DoD implementation of Office of Management and Budget (OMB) Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*. The instruction prescribes applying economic analysis concepts to evaluate costs and benefits of investment alternatives. This instruction is available on the Executive Services Directorate website at www.esd.whs.mil/DD/.

Appendix D.

CAPE Policy Memos

This appendix lists recent Cost Assessment and Program Evaluation (CAPE) policy memos that pertain to cost data reporting. The contents of these memos have been incorporated in the latest issuances of DoDI 5000.73, *Cost Analysis Guidance and Procedures*, and DoDM 5000.04, *Cost and Software Data Reporting (CSDR) Manual*. These memos are available on the Cost Assessment Data Enterprise (CADE) public website at <https://cade.osd.mil/policy>.

Director of Cost Assessment and Program Evaluation Policy Memorandum, “DoD Cost Analysis Data Improvement,” January 9, 2017

Deputy Director of Cost Assessment Policy Memorandum, “Change to Requirement for Submission of Contractor Business Data Report (DD Form 1921-3),” February 6, 2018

Director of Cost Assessment and Program Evaluation Policy Memorandum, “Implementation of Data Reporting Requirements for Acquisition Programs in Accordance with the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2017,” February 16, 2018

Director of Cost Assessment and Program Evaluation Policy Memorandum, “Implementation of Cost Data Reporting Requirements for Middle Tier Acquisition Programs,” August 30, 2018

Director of Cost Assessment and Program Evaluation Policy Memorandum, “Updated Implementation of Cost Data Reporting Requirements in Accordance with Section 2334(g),” January 4, 2019

Deputy Director of Cost Assessment Policy Memorandum, “Implementation of Cost and Hour Report (FlexFile) and Quantity Data Report Within the Cost and Software Data Reporting (CSDR) System,” March 22, 2019

Director of Cost Assessment and Program Evaluation Policy Memorandum, “COVID-19 Cost and Performance Data Collection Guidance,” May 27, 2020

Director of Cost Assessment and Program Evaluation Policy Memorandum, “Implementation of Cost Estimating, Document Collection, and Data Reporting for Fiscal Year 2022 Sustainment Reviews,” March 22, 2022

Director of Cost Assessment and Program Evaluation Policy Memorandum, “Cost Estimating, Document Collection, and Data Reporting for Fiscal Year 2023 Sustainment Reviews,” November 9, 2022

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Appendix E.

CADE and Cost Data Collection Systems

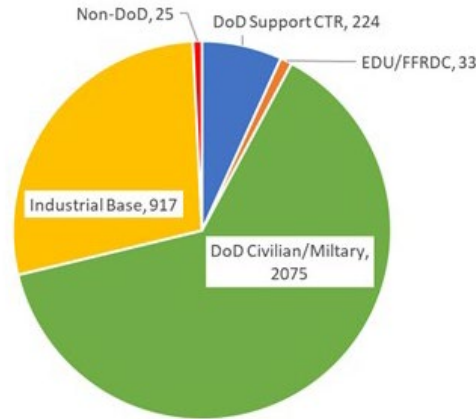
Cost Assessment Data Enterprise

As explained in Chapter II, CADE provides users in the cost analysis community with secure single-point access to a wide range of cost data (much of which are proprietary), related acquisition and technical information, an extensive library, and a variety of specialized datasets and cost tools. The CADE website provides user access to data for approximately programs, supported by roughly 4,000 prime contracts and 2,000 major subcontracts. The specific data systems that are warehoused in CADE are described later in this appendix.

In addition, a complementary public website (<https://cade.osd.mil>) provides considerable background information about CADE, such as the role of the major organizations that support it. The public website contains information about policy and procedures relevant to data reporting and collection and the other initiatives described in Chapter IV, as well as information about training opportunities concerning CADE and its supporting data systems.

Access to CADE is available to government analysts throughout the cost and acquisition communities. CADE is also selectively available to government-sponsored support contractors that sign company-specific nondisclosure agreements. A breakout of active users is shown in Figure E-1.

CADE Account Holder Distribution (as of February 2024)



CADE Government Account Holder Distribution (as of February 2024)

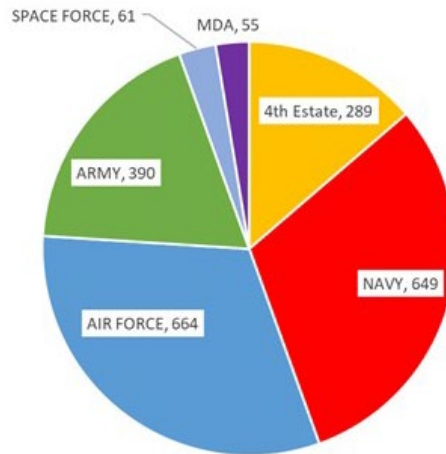


Figure E-1. CADE Users

The term 4th Estate refers to defense agencies and other defense-wide organizations. Note that more than 80 percent of the CADE government users reside in the military departments.

CAPE provides extensive support to CADE users and data providers. For example, CAPE hosts CADE Focus Group meetings that provide a forum for government and industry personnel to learn and ask questions about the latest CADE initiatives and evolving associated policies, processes, and data products. In addition, these meetings allow users to raise issues and concerns and provide feedback. The most recent Focus Group meeting was held in November 2023.

In addition, the CADE training team hosts virtual webinars, live training sessions, and online courses open to industry and government throughout the year. These training activities are described in Appendix G. Further information on CADE training can be found on the CADE public website at <https://cade.osd.mil/support>.

Overview of Cost Data Reporting and Collection

The Department of Defense (DoD) uses two primary data collection systems as the major sources of cost data for acquisition programs:

- Cost and Software Data Reporting (CSDR) system
- Visibility and Management of Operating and Support Costs (VAMOSOC) systems

CSDR reporting uses a common, product-oriented taxonomy known as a Work Breakdown Structure (WBS) that follows the guidelines of the DoD Standard Practice, *Work Breakdown Structures for Defense Materiel Items* (MIL-STD-881F). The WBS is a hierarchy of product-oriented elements (hardware, deliverable software, data, and services) that collectively constitute the system to be developed or produced.

Cost and Software Data Reporting System

The CSDR system is the primary means that DoD uses to collect actual cost and related data on major defense contracts and subcontracts. Under contractual agreements, defense contractors provide information to support the CSDR system, under contractual agreements, by reporting data on development, production, and sustainment costs incurred in executing contracts. The two principal components of the CSDR are the Contractor Cost Data Reporting (CCDR) system and the Software Resources Data Reporting (SRDR) system. These systems are hosted in a secure, web-based information repository within CADE.

Detailed procedures and other implementation guidance for both CSDR systems are found in DoDM 5000.04, *Cost and Software Data Reporting*. This manual was most recently revised in May 2021.

Additional information on CSDR reporting policies can be found on the CADE public website at <https://cade.osd.mil/policy/csdr-timeline>.

Over the past several years, CAPE has significantly expanded the range of CSDR cost reporting to address programs other than MDAPs. Section 842(g) of the NDAA for FY 2017 (enacted in December 2016) amended Title 10, U.S.C., to require that CAPE to develop policies, procedures, guidance, and a collection method to ensure that quality acquisition cost data are collected to facilitate cost estimation and comparison across DoD acquisition programs. Further, DoD must ensure that cost data are collected in accordance with these policies and procedures for each acquisition program with an estimated total acquisition expenditure greater than \$100 million. As a first step, CAPE issued a policy memorandum in January 2017 to address data collection on indefinite delivery/indefinite quantity (ID/IQ) contracts (associated with modernization upgrades and sustainment on existing platforms) and data collection on government-performed efforts supporting acquisition programs. CAPE now requires the collection of cost and software data on delivery/task orders on ID/IQ contracts supporting a major defense acquisition program (MDAP) or Acquisition Category (ACAT) II program where—individually or in aggregate—the value of the delivery/task order(s) related to the program being supported is likely to exceed existing CSDR dollar thresholds over the life of the ID/IQ arrangement. For government-performed efforts, CAPE established a tailored version of cost data reporting from government entities supporting acquisition programs, such as maintenance depots, test sites, arsenals, laboratories, and the Defense Logistics Agency (DLA). As a second step, CAPE issued a second policy memorandum in February 2018 to address cost reporting for ACAT II/III/IV programs (i.e., acquisition programs valued less than MDAP dollar thresholds). Reporting in 2018 began for a

group of high-priority pilot programs for a cross-section of ACAT II/III/IV programs. In August 2018, CAPE issued a third policy memorandum that addressed cost data reporting for MTA programs. Cost data reporting is now required for all MTA programs that meet the \$100 million threshold. In January 2019, CAPE issued a fourth policy memorandum to finalize policies and procedures for ACAT II/III/IV programs based on the lessons learned from experience with the pilot programs. In this memorandum, CSDR reporting was extended to most ACAT II programs, and a waiver was granted indefinitely for ACAT III and IV programs that were not in the group of pilot programs. Since the enactment of Section 842(g) in December 2016, cost data reporting was also expanded to address cost data reporting for the other adaptive acquisition pathways (defense business systems, acquisition of services, and software acquisition programs). DoDM 5000.04 was revised and reissued in May 2021 to provide implementation details concerning these expanded policies and procedures for cost data reporting.

Contractor Cost Data Reporting

CCDR is the primary means within DoD to systematically collect data on the development, production, and sustainment costs incurred by contractors. Section 4 (“Data Collection”) of DoD Instruction (DoDI) 5000.73, *Cost Analysis Guidance and Procedures*, establishes CCDR reporting requirements. For MDAPs and major systems, CCDR reporting is required for contracts, subcontracts, and government-performed efforts valued at more than \$50 million (then-year dollars). For MTA programs anticipated to exceed \$100 million (then-year dollars), CCDR reporting is required for contracts, subcontracts, and government-performed efforts valued at more than \$20 million (then-year dollars). CSDR reporting requirements for programs below the major system threshold are left to the discretion of the military department cost agencies. DoDI 5000.73 is currently being revised to address other acquisition pathways as described in Chapter IV.

The CCDRs provide essential cost information based on actual cost experience not found in other data sources. The reports provide labor hours, material dollars, and overhead dollars by WBS element and cost estimating functional category. The data may also be used to investigate direct and indirect cost behavior and to segregate nonrecurring and recurring costs. The data from these reports can also be used to construct learning-curve projections for labor hours and other recurring costs at various levels of the WBS. The timing of the periodic data reporting is structured to provide key support to the preparation of cost estimates at milestone and other acquisition reviews.

CCDR data collection requirements were extended to sustainment contracts in 2012. Since then, CAPE has continued to improve the collection and reporting of contractor actual costs for major sustainment, logistics, and maintenance contracts. The first cost data report for sustainment was approved in May 2012 and became effective at that time. This summary report collects and displays contractor costs by CAPE operating and support (O&S) cost element. A second and more detailed cost data report (known as the Sustainment Functional Cost-Hour Report) was approved in September 2015. This report, for selected high-cost elements, provides visibility into labor and material for a specific cost element by functional category, such as touch maintenance labor hours or purchased parts dollars. For current and former MDAPs and major systems, these

reports are now required on major sustainment contracts and subcontracts worth more than \$50 million (then-year dollars).

Additional information on CSDR sustainment data can be found on the CADE public website at <https://cade.osd.mil/policy/sustainment>.

An additional data report, known as the Maintenance and Repair Parts Data Report, has been developed to collect detailed cost and technical data for maintenance events and repair parts, similar to the data already collected by maintenance data collection systems for major weapon systems supported under organic maintenance. For each maintenance event, this report collects (1) maintenance data, such as reason for failure, maintenance type, and labor hours; and (2) repair data, such as the name and repair or replacement cost of the repair part. For MDAPs and major systems, a Maintenance and Repair Parts Data Report is required for sustainment contracts that exceed \$100 million (then-year dollars) when a significant portion of the cost of the contract is due largely to parts-related maintenance activities (such as supply chain management, heavy maintenance, recurring spares, or repairs), and equivalent information cannot be provided by the program manager.

Additional information on the Maintenance and Repair Parts Data Report can be found on the CADE public website at <https://cade.osd.mil/policy/maintandrepair>.

The legacy CCDR reports are being replaced with the Cost and Hour Report (FlexFile), as described in Chapter IV. The new FlexFile report format is designed to enable data submissions to generate the equivalent of each legacy report.

Software Resources Data Reporting

The SRDR system collects software cost metrics data to supplement the CCDR cost data and to provide a better understanding and improved estimating of software-intensive programs. Data collected from applicable contracts include type and size of the software application(s), schedule, and labor resources needed for software development. The SRDR data formats and reporting instructions use state-of-the-art terms, definitions, and agile metrics for software development. SRDR reporting was expanded in 2016 to include major software maintenance activity. SRDR reporting was expanded again in 2017 for an important class of defense business systems/information systems known as Enterprise Resource Planning (ERP) systems. The data report formats and reporting instructions for the three data reports (software development, software maintenance, and reporting for ERP programs) continued to be refined; final versions of these data reports were approved in October 2022.

Section 4 of DoDI 5000.73 establishes SRDR reporting requirements. For software development and ERP reports, SRDR is required on all contracts, subcontracts, and government-performed efforts for MDAPs, major systems, and MTA programs anticipated to exceed \$20 million (then-year dollars). For the software maintenance report, SRDR is required on all contracts, subcontracts, and government-performed efforts for MDAPs and major systems anticipated to exceed \$50 million (then-year dollars).

Additional information on software data reporting can be found on the CADE public website at <https://cade.osd.mil/policy/srdr>.

Contractor Business Data Report

One of the reports in the CSDR system is the Contractor Business Data Report (referred to as the 1921-3 by the cost analysis community). Although other CSDR reports focus on individual programs and contracts, the Contractor Business Data Report collects general contractor cost data stratified by direct categories (direct labor, direct material, and other direct expenses) and indirect categories (overhead, general and administrative, and other indirect expenses) for a company business unit, thereby providing a firm basis for assessing contractor overhead and other indirect costs. These assessments are based on the occurrence of actual indirect expenses relative to an actual defined business base; they are not measured as a generic indirect percentage rate relative to an undefined business base.

The design of the Contractor Business Data Report used from 2009 to 2015 was based on government-defined categories for direct and indirect expenses. By 2015, actual experience with the report revealed that each contractor defines direct and indirect costs differently. The contractor categories typically do not have a simple correspondence to the government categories, so the Contractor Business Data Report format was forcing contractors to map their expenses to the government categories. This approach caused the mapping to be artificial and somewhat arbitrary, obfuscating important business base information. In addition, this mapping was not readily visible to government users of the report.

To remedy this situation, CAPE developed a new draft Contractor Business Data Report format with associated instructions and distributed it to reporting contractors in February 2018. The report can be submitted in the contractor's format and rate structure and is more useful to the cost analysis community, because it eliminates the mapping issue. In addition, this report is more applicable to the contract cost and price communities because the new format aligns with contractor proposals, Defense Contract Management Agency forward pricing rate proposals, forward pricing rate agreements, and Defense Contract Audit Agency audits. The report is also less burdensome for contractors to prepare. During 2018 and 2019, contractors could choose whether to use the previous report with the government-defined categories, or use the new draft Contractor Business Data Report. Beginning in 2020, this report transitioned to the contractor-defined format. The final version of the report format and reporting instructions were approved in March 2021.

A sample format, reporting instructions, and other information on the new Contractor Business Data Report can be found on the CADE public website at <https://cade.osd.mil/policy/1921-3>.

CSDR Planning

A CSDR plan is submitted for approval prior to the release date of an RFP for each contract meeting the CSDR reporting requirements. Each plan specifies the required reports and submission frequency for the major contracts and subcontracts. CAPE provides formal standards for CSDR plans that include a template of the reporting structure for each weapon system commodity type, such as aircraft, electronic system, or missile. These standards provide

consistency in data reporting across programs within a commodity type and provide better communication of government expectations to industry. Using standard plans also reduces the burden on program offices and cost analysis organizations, since they no longer have to construct a plan from scratch for each new program. The standard template for each program CSDR plan is subject to tailoring approved by the cost working integrated product team (CWIPT), which consists of appropriate stakeholders for the program.

The standard plans are available on the CADE public website at <https://cade.osd.mil/policy/csdr-plan>.

Cost Data Collection for Test and Evaluation

Section 839 of the NDAA for FY 2018 required senior officials in major test and evaluation organizations to jointly develop policies, procedures, guidance, and a method to collect consistent and high-quality data on the full range of estimated and actual costs of development, live fire, and operational testing for MDAPs. In response, DoD formed a Cost of Test and Evaluation Working Group with representatives from various stakeholders in the military departments and OSD. The working group developed a template describing the needed data at an appropriate level of detail that DoD should collect and maintain electronically. The working group determined the changes to the WBS cost elements pertaining to the test and evaluation that met the intent and design of the template. These WBS changes have been incorporated in DoD Standard Practice, *Work Breakdown Structures for Defense Materiel Items* (MIL-STD-881F). These changes were also incorporated into the cost data reporting procedures prescribed in DoDI 5000.73 and DoDM 5000.04, which are described in Chapter II. The new test and evaluation cost data will be archived in CADE as part of the MDAP cost data reporting process.

Cost Reporting for Missile Defense Agency Programs

CAPE has worked with the Missile Defense Agency to establish cost data collection for missile defense programs. Although these programs are exempt from traditional DoD acquisition processes and requirements, the agency has instituted a policy to collect CSDR data for its high-cost programs. For such programs, the CSDR plans are subject to approval by CAPE.

Cost and Software Data Reporting Compliance

The Defense Cost and Resource Center (DCARC)¹ continually monitors each MDAP for compliance with CSDR requirements, where applicable. CSDR reporting is not required when (1) the program is in pre-Milestone A status, with no prototypes, or (2) the CSDR requirements have been waived by CAPE. Waivers for CSDR requirements may be granted when (1) the relevant item being procured is truly a commercial item, or (2) an item is purchased under competitively awarded, firm fixed-price contracts, as long as competitive conditions remain.

The most recent CSDR compliance rating criteria for programs are provided in Figure E-2.

¹ The DCARC is the CAPE field office responsible for administering the CSDR system.

CSDR Compliance Rating Criteria

Implementation in January 2017 (Changes Shown in Red)

RATING	CRITERIA
Green	No open CSDR compliance issues.
Green Advisory	Outstanding CSDR deliverable less than or equal to three months overdue.
Yellow	Outstanding CSDR deliverable greater than three months, but less than or equal to six months overdue.
Red	<ol style="list-style-type: none"> 1. Outstanding CSDR deliverable greater than six months overdue. 2. Formally rejected CSDR deliverable outstanding greater than 30 days overdue.
Red-Critical	<ol style="list-style-type: none"> 1. Program Office released Request for Proposal (RFP) without approved CSDR plan. 2. Program Office awarded prime contract without approved CSDR plan or failed to mod contract to place an approved CSDR plan on contract. 3. Program Office or Prime contractor failed to enforce flow down of CSDR requirements to direct reporting subcontractor or the prime contractor failed to mod subcontract to place an approved CSDR plan on contract. 4. Three or more consecutive formal rejections for the same CSDR deliverable event will remain red-critical until the deliverable is accepted. 5. Outstanding CSDR deliverable greater than 12 months overdue.
Not Rated	The program has no CSDR activity (e.g., approved waiver, Pre-MDAP, cancelled, has no CSDR activity, or not currently tracked)

Figure E-2. CSDR Compliance Rating Criteria

Figure E-3 provides a breakdown of CSDR compliance by fiscal quarter, using the compliance ratings in effect at the time for all reporting programs since FY 2016.

CSDR Compliance History

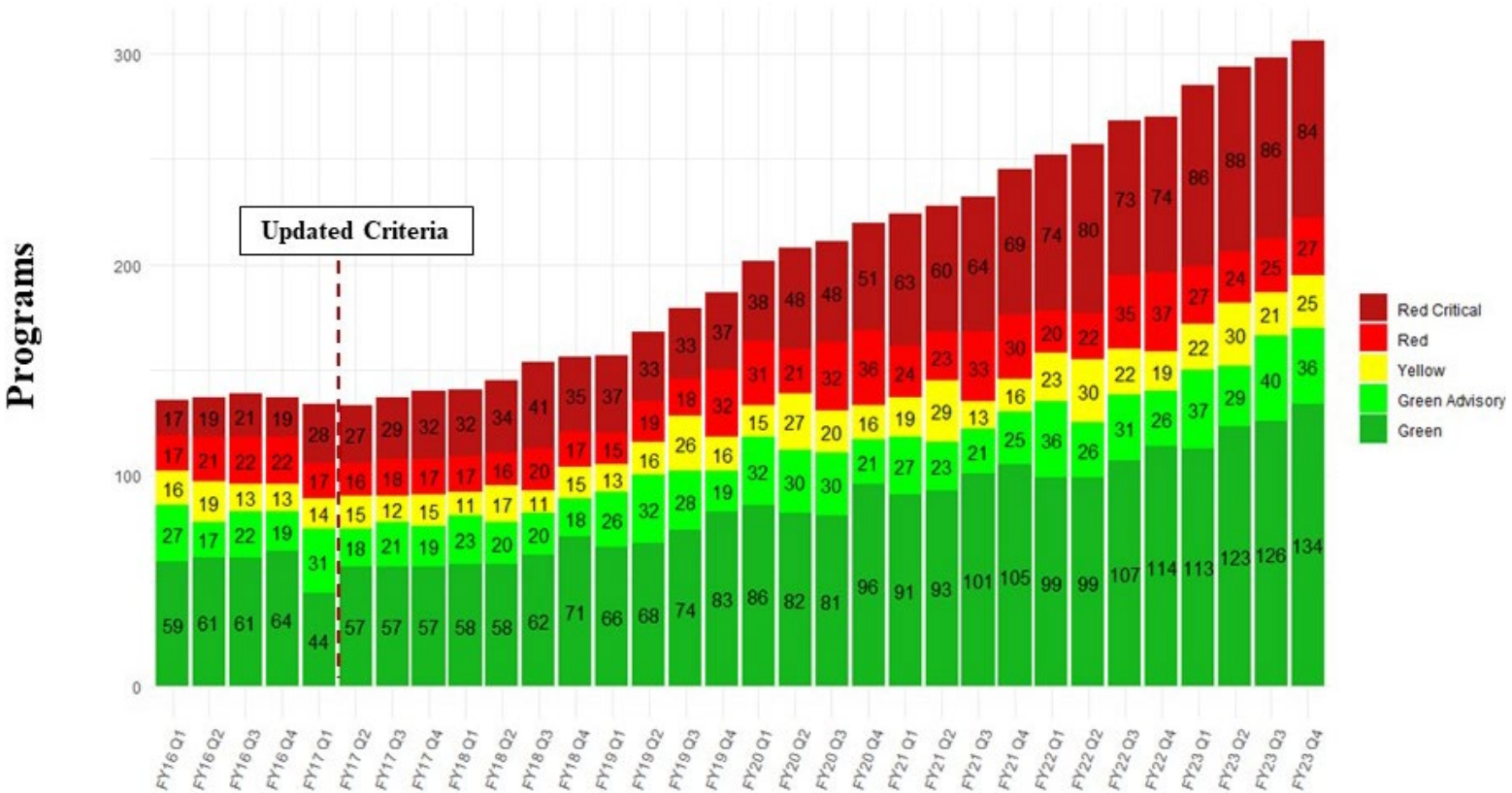


Figure E-3. CSDR Compliance by Fiscal Quarter

Note that the compliance ratings were revised in January 2017. With this revision, the compliance rating criteria became stricter, leading to an increase in red and/or red-critical ratings. Also, the number of reporting programs over time has grown significantly with the expansion of cost data reporting.

At the end of the fourth quarter of FY 2023, 56 percent of the programs receiving a rating were rated as green or green advisory, 8 percent were rated as yellow, and 36 percent were rated as red or red-critical. The number of programs with a red or red-critical rating, as a percentage of all reporting programs, has been stable over the last 3 years. Between the end of the first quarter of FY 2021 and the end of the fourth quarter of FY 2023, the average percentage number of red and red-critical programs was 39 percent.

CAPE and the DCARC continue to emphasize CSDR reporting compliance in order to achieve more accurate and timely cost data to support program cost estimates. In November 2014, CAPE revised language in the Defense Federal Acquisition Regulation Supplement that ensure that CSDR reporting requirements are made known to contracting officers. In addition, in cases where required cost data are not reported in a timely fashion (i.e., are more than 6 months late), CAPE insists that the data be provided before CAPE can complete its independent cost estimate (ICE) or concur with a military department cost estimate. In addition, for MDAPs, CAPE provides an assessment of a program's CSDR compliance that is included in the quarterly Defense Acquisition Executive Summary reporting.

Technical Data Report

Cost analysts need technical data (e.g., design and performance parameters) for legacy and new systems to adjust for complexity and to develop cost-estimating relationships used in estimates. Section 4 of DoDI 5000.73 requires a Technical Data Report on all contracts and government-performed efforts valued at more than \$50 million (then-year dollars) for MDAPs and major systems when the program manager cannot provide equivalent information.

CAPE provides standardized data templates for technical data reporting that specify the universe of technical parameters that can be collected for each weapon system commodity type (such as aircraft, ships, and missiles) and define each parameter consistent with systems engineering practices, military standards, and industry guidelines. These formats were developed so that the parameters, definitions, and collection methodologies are consistent with DoD and industry norms, and that any requirements for contractor reporting on technical data are not excessively burdensome or redundant with contractor reporting already in place.

As of November 2023, 182 technical data reports have been submitted. Figure E-4 displays the number of submissions by commodity type.

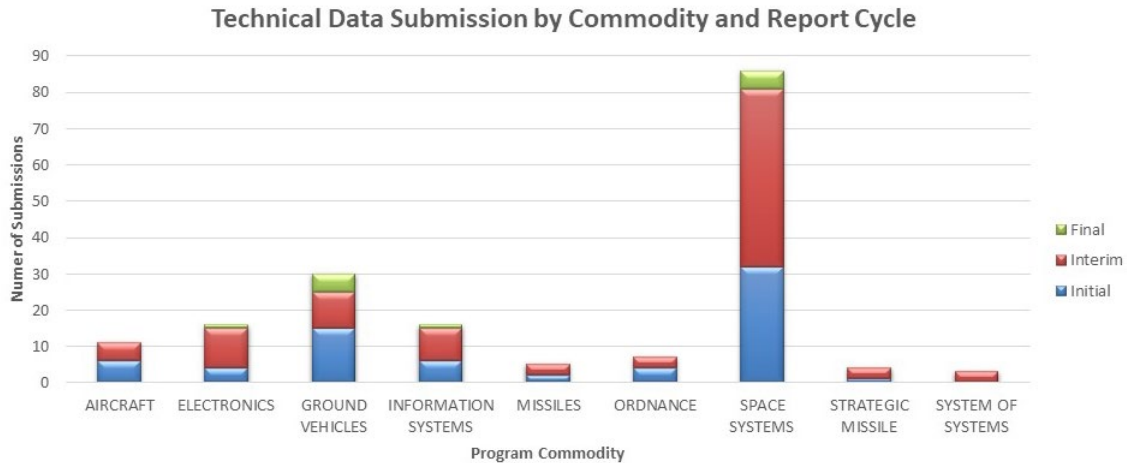


Figure E-4. Technical Data Report Inventory

Additional information on technical data reporting can be found on the CADE public website at <https://cade.osd.mil/policy/techdata>.

Contracts Price Database

CADE hosts not only cost data reports, but also contract data. Over the past decade, the military department cost agencies have funded the development of a Contracts Price and Schedule Database. This database is unique in providing information at the level of the contract line item number (CLIN) for a variety of system types. In cases where CSDR reporting requirements were not in place, these CLIN-level data may be the only cost data available to the cost analysis community. Where CSDR data do exist, the database provides useful contextual information, such as contract type or profit margin and important cross-checks to other cost data. The database can also be used to construct metrics for cost and schedule growth over contract execution. A new tool to analyze the contracts database became available to CADE users in October 2019.

Selected Acquisition Report Database

CADE now hosts a database of Selected Acquisition Reports (SARs) that includes older acquisition programs. The current Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) system that is used for modern electronic reporting of SAR data, known as Defense Acquisition Visibility Environment (DAVE), contains reports from 1997 to the present. Prior to 1997, SAR data were provided in hard copy. The military departments have databases for the older SAR data that have been keystroked from portions of the official paper SARs; these databases have been merged with the DAVE data to provide CADE users with a relational and authoritative database of SAR data. This database is useful to cost analysts and includes program information such as mission and description, schedule, performance, cost and funding, major contracts, and deliveries and expenditures.

In addition, the CADE library contains a large collection of historical SAR documents in PDF form for easy access by the cost community. A wide range of SARs from 1969 to 2014 are now

available; in total, 2,721 SARs from almost 400 programs are now accessible in the CADE library.

EVAMOSC

The EVAMOSC initiative is described in Chapter II. This section provides a discussion of its latest implementation status and accomplishments.

EVAMOSC Data Availability

In March 2023, the EVAMOSC platform was launched and became accessible to the DoD cost community. The EVAMOSC team of data engineers, subject matter experts, technical architects, and key stakeholders collects terabytes of information from numerous disparate, unconnected source data systems across DoD. Since the initial launch, EVAMOSC has incorporated over 14 Army and United States Marine Corps (USMC) source data systems. Once data are imported into EVAMOSC, the team applies a rigorous data transformation and normalization process to ensure the data represented in the database aligns with O&S cost data policy and are accurate and transparent. Data transformation is at the heart of EVAMOSC operations; it enables more comprehensive and defensible O&S cost estimates and facilitates in-depth analysis. In FY 2023, the following data are available on EVAMOSC:

- Army Field and Depot Maintenance
 - \$25.0B of organic maintenance data for ~1,200 Army weapon systems from the Global Combat Support System (GCSS-A, an Army field maintenance database) and the Logistics Modernization Program (LMP, an Army depot maintenance database)
- Army Military Manpower Data
 - \$4.9B of military operations and unit-level maintenance manpower data mapped from the Defense Manpower Data Center (DMDC). EVAMOSC is the first and only DoD database that has successfully mapped manpower cost data to Army weapon systems
- Army Aviation Utilization Data
 - First and only “analysis ready” collection of flying hours, number of flights, fuel consumption, and munitions expended for army aircraft
- USMC Field Maintenance & Hardware Modification Data
 - \$4.8B of organic data for ~800 USMC weapon systems from GCSS-MC, the Standard Accounting Budget Reporting System (a Navy/USMC general ledger financial database) and the Defense Agency Initiative general ledger database. EVAMOSC is the first and only database within DoD to provide “analysis ready” USMC maintenance data
- USMC Military Manpower Data

- \$3.95B of military operations and unit-level maintenance manpower data mapped from DMDC. EVAMOSOC is the first and only DoD database that has successfully mapped manpower cost data to USMC weapon systems
- Army & USMC Major Weapon System Inventory Data
 - EVAMOSOC provides DoD's most comprehensive collection of system quantities over time and by unit
- Self-Service Analytics
 - Enables additional detailed data exploration and analysis data beyond what are available in EVAMOSOC front-end workbooks. Analysts are able to use a Tableau user interface to create personalized detailed data tables and visualizations, or export large datasets from the EVAMOSOC database and use in the data analytics tool of their choice

Many of these data products are available at an enterprise level for the first time in DoD.

In addition to providing the growing repository of O&S data available on EVAMOSOC, CAPE recognizes the importance of collaborating early and often with the military services to ensure EVAMOSOC data are accurate, consistent among the military services, clearly documented, and informative. The EVAMOSOC team has developed documentation describing in detail how source data are transformed, standardized, and published. A comprehensive data catalog, Collibra, has also been implemented to increase transparency of data normalization and transformation. In addition, the EVAMOSOC team has developed training videos to help analysts better understand the data and how to access them using the Tableau user interface. The Collibra application, along with the documentation and training videos, can be accessed from the EVAMOSOC portal.

EVAMOSOC User Engagement

EVAMOSOC has a growing user base consisting of 268 users across all military departments and various other DoD organizations (the Missile Defense Agency, OSD, the Defense Contract Management Agency, and Defense Acquisition University (DAU)). The EVAMOSOC team has been engaging in outreach activities and events such as Army and USMC stakeholder engagement, the Air Force Total Ownership Cost users conference, the Practical Software and Systems Measurement product support workshop, the Collaborative Cost Research Group, International Cost Estimating and Analysis Association conference, and the National Capital Region Program Development Initiative. In addition, the EVAMOSOC team publishes a quarterly newsletter and hosts virtual office hours (held bi-weekly) and webinars on O&S specific topics and EVAMOSOC features and data releases. EVAMOSOC also has an active and responsive help desk to engage with users and address their questions and concerns.

EVAMOSOC Data in Use

EVAMOSOC data have proven to be useful across many areas, such as sustainment reviews and O&S cost estimates, readiness analyses, programming and budgeting validation, and DoD audits. Since EVAMOSOC's inception, its data have been used to support numerous activities, such as:

- Army and USMC sustainment reviews and milestone ICEs, as well as a non-delegated sustainment review for the Nimitz-class carriers
- Advana’s Sustainment Dashboard in support of the Sustainment Deputies Management Action Group
- The CAPE Joint Data Support organization: it supports the DoD analytic community, and uses EVAMOSC weapon system quantities data for its fiscal year inventory calculations
- The Army G-8 (Program Analysis and Evaluation): it is performing depot requirements analysis using EVAMOSC normalized LMP data for a directed Program Defense Memorandum study
- EVAMOSC data are the principal source of data for the CAPE Analytic Innovation Lab’s automated “Independent Cost Estimate Report”

The EVAMOSC team is actively working with stakeholders and users to understand DoD’s analytical needs and to continue to provide detailed sustainment data to the DoD community.

Military Department VAMOSC Systems

DoD requires that each military department maintain a system that collects historical data on the O&S costs for major fielded weapon systems. The CAPE 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 how each military department implements VAMOSC.

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

- The Air Force VAMOSC system is known as the Air Force Total Ownership Cost (AFTOC) system. AFTOC provides O&S cost data for all manned and unmanned aircraft; aircraft engines; missiles; munitions; command, control, and communication systems; space systems; and other miscellaneous systems and programs. AFTOC also provides supplementary data such as aircraft quantities and flying hours, fuel consumption, numbers of personnel by skill/function, and other non-cost information. AFTOC is managed by the Deputy Assistant Secretary of the Air Force for Cost and Economics. See <https://aftoc.hill.af.mil> for additional information.
- The Army VAMOSC system is known as the Operating and Support Management and Information System (OSMIS). OSMIS provides O&S cost data for aviation, tracked and wheeled combat vehicles, artillery systems, engineering and construction equipment, communication and electronic systems, and other tactical systems and equipment. It also

provides supplementary data such as system quantities; vehicle miles; aircraft flying hours; consumption for repair parts, fuel, and ammunition; and man-hours for intermediate and depot maintenance. OSMIS is managed by the Deputy Assistant Secretary of the Army for Cost and Economics. See <https://www.asafm.army.mil/Cost-Materials/Cost-Models/#osmis> for additional information.

- The Department of the Navy system is known as Naval VAMOSC and includes both Navy and Marine Corps platforms and systems. Naval VAMOSC provides O&S cost data for ships and shipboard systems, Navy and Marine Corps aircraft, weapons (missiles and torpedoes), military and civilian personnel, facilities, and Marine Corps ground systems. Naval VAMOSC also provides key non-cost data, such as personnel counts for ship crews and aircraft Type Model Series, system quantities, flying hours/ship steaming days, fuel consumption, and maintenance hours/days. Naval VAMOSC is managed by NCD/FMB-6. See <https://www.vamosc.navy.mil> for more information.

The military departments provide training and documentation for their VAMOSC users. The training material consists of on-site presentations and online videos. The documentation consists of extensive user guides and manuals.

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Appendix F.

Legislative Changes

The National Defense Authorization Acts (NDAAs) for fiscal year (FY) 2016 through FY 2024 significantly changed acquisition and cost assessment policy and statutory requirements. These changes have been assessed by the Under Secretary of Defense (Acquisition and Sustainment) (USD(A&S)) and Cost Assessment and Program Evaluation (CAPE) to determine the appropriate revisions that were incorporated into DoDI 5000.02, *Operation of the Defense Acquisition System*, its supplementary acquisition regulations, and DoDI 5000.73, *Cost Analysis Guidance and Procedures*.

The NDAA for FY 2024 contains the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 806 (Principal Technology Transition Advisor) requires each military department to designate a senior official (a member of the Senior Executive Service or a general officer) to identify technologies being researched, developed, tested, or evaluated by DoD science and technology programs, as well as technologies from private commercial entities, research institutions, universities, and other entities that the military department may use to meet identified and potential warfighter requirements. The Principal Technology Transition Advisor will inform program managers and other relevant acquisition officials of these relevant technologies, and serve as an advisor to the service acquisition executive, to help transition technology from the science and technology ecosystem to programs of record.
- Section 808 (Pilot Program for the Use of Innovative Intellectual Property Strategies) requires the Secretary of each military department and USD(A&S) to establish a pilot program to designate one acquisition program for the use of innovative intellectual property strategies in order to acquire the necessary technical data rights required for the operations and maintenance of that system. The innovative intellectual property strategies used may include the following: (1) the use of an escrow account to verify and hold intellectual property data, (2) the use of royalties and licenses, and (3) other strategies as determined by DoD.
- Section 810 (Updated Guidance on Planning for Exportability Features for Future Programs) requires USD(A&S) to ensure that program guidance for MDAPs and MTA programs is updated to integrate planning for exportability features. This planning shall address (1) for MDAPs, an assessment of such programs to identify potential exportability needs; and (2) for technologies used in MTA programs that are transitioned to a major capability acquisition program, an assessment of potential exportability needs for such technologies.
- Section 811 (Modernizing the Department of Defense Requirements Process) requires that DoD, acting through the Vice Chairman of the Joint Chiefs of Staff, in coordination with the Secretaries of the military departments and the commanders of the combatant commands, and in consultation with USD(A&S), shall develop and implement a streamlined requirements process for DoD, to include revising the Joint Capabilities

Integration and Development System, in order to improve alignment between modern warfare concepts, technologies, and system development and reduce the time to deliver needed capabilities to warfighters.

- Section 820 (Amendments to Multiyear Procurement Authority) amends certain Title 10 statutory provisions to modify the justification required for the use of multiyear contracting authority to include industrial base stability, not just projected cost savings.
- Section 824 (Modification and Extension of Temporary Authority to Modify Certain Contracts and Options Based on the Impacts of Inflation) extends DoD authority through December 31, 2024 to modify certain contracts based on inflation impact.
- Section 826 (Modification of Contracts and Options to Provide Economic Price Adjustments) allows DoD to modify contract options for economic price adjustment, but DoD may seek consideration when considering to modify contracts to include an economic price adjustment clause.
- Section 827 (Modifications to Earned Value Management System Requirements) requires USD(A&S) to increase the contract value thresholds associated with requiring earned value management (EVM) on cost or incentive contracts from \$20 million to \$50 million, increase the contract value threshold for a contractor to use an EVM system from \$50 million to \$100 million, and exempt contracts and subcontracts primarily performing software effort from the EVM requirement.
- Section 835 (Enhanced Domestic Content Requirement for Major Defense Acquisition Programs) increases domestic content requirements for manufactured articles, materials, or supplies procured in connection with an MDAP in order to support the defense industrial base and secure supply chains. Section 835 provides an exception for trusted allies by exempting countries with a reciprocal defense procurement agreement with DoD or are in the National Technology and Industrial Base. DoD shall establish an information repository for the collection and analysis of information related to domestic source content for products that DoD deems critical, where such information can be used for continual data analysis and program management activities.
- Section 841 (Pilot Program to Accelerate Contracting and Pricing Processes) extends through January 2, 2028 a pilot program, established by Section 890 of the NDAA for FY 2019, for streamlined contracting and pricing processes.

The NDAA for FY 2023 contains the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 351 (Resources Required for Achieving Materiel Readiness Metrics and Objectives for Major Defense Acquisition Programs) requires CAPE to submit to Congress a comprehensive estimate of the funds necessary to meet specified materiel readiness objectives through the period covered by the most recent Future Years Defense Program (FYDP). For each major weapon system, CAPE will provide the Operations and Maintenance (O&M) funds that have been obligated for the prior year (second year preceding the budget year), the O&M funds that will have been obligated by the end of the current year (first year preceding the budget year), and the O&M funds that have been programmed and budgeted across the FYDP. These funding estimates will be submitted no later than 5 days after the DoD President's Budget Request is

submitted to Congress. This new reporting requirement may be met by a phased implementation beginning in the budget request for FY 2024 and fully implemented by the budget request for FY 2026.

- Section 806 (Life Cycle Management and Product Support) amends Title 10 U.S.C. § 4324 (Life Cycle Management and Product Support) to require that the Milestone Decision Authority (MDA) approve the life cycle sustainment plan after receiving the views from appropriate materiel, logistics, or fleet representatives. This provision also requires the life cycle sustainment plan to address (1) an intellectual property management plan for product support, including requirements for technical data, software, and modular open systems approaches, and (2) an estimate of the number of personnel needed to operate and maintain the system, including military personnel, Federal employees, contractors, and host nation support personnel (as applicable).
- Section 809 (Acquisition Reporting System) expands upon Section 830 (Modification of Requirements for Reporting to Congress on Certain Acquisition Programs) of the NDAA for FY 2020 and Section 805 (Two-Year Extension of Selected Acquisition Report Requirement) of the NDAA for FY 2022. This provision requires DoD to replace the Selected Acquisition Reports (SARs) with the new acquisition reporting system as soon as practicable, but no later than June 30, 2023. The new reporting system shall incorporate the lessons learned from the demonstrations called for in Section 805 of the NDAA for FY 2022.
- Section 822 (Modification of Contracts to Provide Extraordinary Relief Due to Inflation Impacts) provides DoD with temporary authority to allow funds to be used to modify the terms and conditions of a contract or option to provide an economic price adjustment when—due solely to economic inflation—the cost to a contractor of performing the contract is greater than the price of the contract.
- Section 2806 (Supervision of Large Military Construction Projects) requires the individual directing and supervising a contract with a value greater than \$500 million in connection with a military construction project to submit a report on the intended supervision, inspection, and overhead plan to manage such project. In addition, CAPE is required to conduct or approve an ICE for all MDAPs and major subprograms, in advance of any decision to enter into a contract in connection with a military construction project of a value greater than \$500 million.

The NDAA for FY 2022 contained the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 805 (Two-Year Extension of Selected Acquisition Report Requirement) expanded Section 830 of the NDAA for FY 2020. The requirement that SARs continue in their present form was extended from FY 2021 to FY 2023. No later than March 1, 2022, and every 6 months thereafter, DoD is required to provide to the congressional defense committees a demonstration of the capability improvements necessary to achieve the full operational capability of the reporting system that will replace the SAR requirements. Also, no later than March 1, 2022, the Director of Cost Assessment and Program Evaluation (DCAPE) will prepare a plan for identifying and gathering the data

required for effective decision-making by program managers and DoD leadership regarding the reporting programs. No later than July 1, 2022, USD(A&S) will submit to the congressional defense committees the DoD implementation plan for the replacement reporting system.

- Section 806 (Annual Report on Highest and Lowest Performing Acquisition Programs of the DoD) established a requirement for each Component Acquisition Executive (CAE) to provide the congressional defense committees with an annual report that ranks the five highest performing and five lowest performing covered acquisition programs of the DoD Component. Each CAE will determine and document the criteria for the ranking of the covered programs. The term “covered acquisition program” means an MDAP or other acquisition program that is expected to reach MDAP dollar thresholds. This annual reporting is limited to 3 years.
- Section 811 (Certain Multiyear Contracts for Acquisition of Property: Budget Justification Materials) established a requirement for DoD to include a detailed proposal with the President’s Budget Request materials if DoD proposes to cancel or reduce the end item quantities of a multiyear procurement contract.

The NDAA for FY 2021 contained the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 151 (Budgeting for Life-Cycle Costs of Aircraft for the Army, Navy, and Air Force) established a requirement for the Secretary of Defense to submit an annual plan for procuring aircraft in the military departments in order to meet the requirements of the National Defense Strategy. This plan includes the estimated levels of annual investment funding necessary to carry out each aircraft program, and the estimated annual funding necessary to operate, maintain, sustain, and support each aircraft program throughout the life cycle of the program. For each of these two cost estimates, the plan documents whether the cost estimate is derived from a military department cost position or from a CAPE estimate. If the military department cost position and the CAPE estimate differ by more than 5 percent for any aircraft program, the plan will document the percentage difference and provide sufficient rationale to explain the difference.
- Section 802 (Improving Planning, Execution, and Oversight of Life Cycle Sustainment Activities) modified Title 10 U.S.C. to improve DoD’s planning, execution, and oversight of life cycle sustainment activities for covered systems. This section modified the earlier provisions of Section 849 (Improved Life-Cycle Cost Control) of the NDAA for FY 2017. In particular, this section directed the Secretary of each military department to conduct a sustainment review for an MDAP 5 years after declaration of IOC and every 5 years thereafter throughout the life cycle of the program. This section also added the requirement to report any critical operating and support (O&S) cost growth. The term critical O&S cost growth means O&S cost growth of at least 25 percent more than the estimate documented in the most recent ICE for the system, or at least 50 percent more than the estimate documented in the original baseline estimate for the system. The Secretary of each military department annually submits to the congressional defense committees the sustainment reviews required for each fiscal year.

The Comptroller General of the Government Accountability Office annually selects 10 covered systems for which a sustainment review has been submitted and submits to the congressional defense committees an assessment of the steps taken by the Secretaries concerned to quantify and address any critical O&S cost growth for each selected system.

The NDAA for FY 2020 contained the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 830 (Modification of Requirements for Reporting to Congress on Certain Acquisition Programs) required that SARs continue in their present form through FY 2021. This provision also required the Secretary of Defense to propose an alternative method for reporting the status for MDAPs and acquisition programs that use alternative acquisition pathways or tailored acquisition procedures.
- Section 831 (Pilot Program to Streamline Decision-Making Processes for Weapon Systems) required each service acquisition executive (SAE) to recommend to the Secretary of Defense at least one MDAP as a pilot program, including tailored measures to streamline the entire milestone decision process, with the results evaluated and reported for potential wider use.
- Section 836 (Report on Realignment of the Defense Acquisition System to Implement Acquisition Reforms) required the Secretary of Defense to include with the President's Budget Request for FY 2021 a report on the progress of implementing acquisition reform initiatives that were enacted into law through DoD regulations, directives, instructions, or other guidance.
- Section 837 (Report on the "Middle Tier" of Acquisition Programs) required USD(A&S) to submit a report that includes the guidance required by Section 804 (Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding) of the NDAA for FY 2016. This guidance includes the business case elements required by an acquisition program and the metrics required to assess the performance of such a program.

The NDAA for FY 2019 contains the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 817 (Preliminary Cost Analysis Requirement for Exercise of Multiyear Contract Authority) contained a clarifying amendment to Title 10 U.S.C. § 3507 (Multiyear Contracts) that a cost analysis supporting a DoD multiyear request is preliminary.
- Section 831 (Revisions in Authority Relating to Program Cost Targets and Fielding Targets for Major Defense Acquisition Programs) modified Section 807 of the NDAA for FY 2017. The individual responsible for establishing program cost, fielding, and performance goals is no longer the Secretary of Defense, but rather is the MDA for the program.
- Section 832 (Implementation of Recommendations of the Independent Study on Consideration of Sustainment in Weapon Systems Life Cycle) required the Secretary of Defense to begin implementing each recommendation of an independent assessment conducted by the MITRE Corporation (of the extent to which sustainment matters are

considered in decisions related to requirements, acquisition, cost estimating, and programming and budgeting for MDAPs). This assessment was directed by Section 844 of the NDAA for FY 2017. The implementation of each recommendation is to commence no later than 18 months after the enactment of the NDAA for FY 2019. CAPE efforts to address certain improvements concerning the collection of O&S cost data recommended by the MITRE study are discussed in Chapter IV.

The NDAA for FY 2018 contained the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 802 (Management of Intellectual Property Matters Within the Department of Defense) required DoD to develop policy on the acquisition or licensing of intellectual property. The purpose of this policy is to enable coordination and consistency across the military departments and DoD in strategies for acquiring or licensing intellectual property to (1) ensure that program managers fully consider and use all available techniques and best practices for acquiring or licensing intellectual property early in the acquisition process; and (2) encourage customized intellectual property strategies for each system based on, at a minimum, the unique characteristics of the system and its components, the product support strategy for the system, the organic industrial base strategy of the military department concerned, and the commercial market. This provision also required DoD to establish a cadre of personnel who are experts in intellectual property matters. These experts are assigned to a program office or an acquisition command within a military department to advise, assist, and provide resources to a program manager or program executive officer on intellectual property matters at various stages of a system's life cycle.
- Section 833 (Role of the Chief of the Armed Force in Materiel Development Decision and Acquisition System Milestones) established a role for the Service Chiefs to concur with MDAP milestone approvals made by the MDA. As a result, the MDA must determine that the Service Chief and Secretary of the military department concur with the trade-offs among cost, schedule, technical feasibility, and performance at each milestone throughout the life of the program.
- Section 836 (Codification of Requirements Pertaining to Assessment, Management, and Control of Operating and Support Costs for Major Weapon Systems) amended Title 10 U.S.C. to codify Section 832 of the NDAA for FY 2012. This provision mandated several ambitious requirements intended for DoD to take specific steps to improve its processes for estimating and managing O&S costs of major systems. In particular, DoD is required to periodically update estimates of program O&S costs and to track and assess these estimates relative to previous estimates. The *CAPE Operating and Support Cost-Estimating Guide* describes how DoD has implemented this legislative provision in various DoD instructions and regulations. This guide also recommends approaches and analytic methods for dealing with these legislative requirements. In addition, DCAPE is responsible for developing and maintaining a database on (1) O&S cost estimates, (2) supporting documentation, and (3) actual O&S costs for major weapon systems. Cost estimates and supporting documentation are archived in the Cost Assessment Data

Enterprise (CADE). The Enterprise Visibility and Management of Operating and Support Cost (EVAMOS) system will provide a single source of O&S cost data.

- Section 839 (Enhancements to Transparency in Test and Evaluation Processes and Data) required senior officials in major DoD test and evaluation organizations to jointly develop policies, procedures, guidance, and a method for collecting consistent and high-quality data on the full range of estimated and actual costs of development, live fire, and operational testing for MDAPs. These data are to be stored in an electronic database maintained by CAPE and made available for analysis by testing, acquisition, and other analysts in DoD. The DoD implementation of this provision is described in Appendix C.
- Subtitle G (Provisions Relating to Other Transaction Authority and Prototyping) of Title VIII (Acquisition Policy, Acquisition Management, and Related Matters) contained eight sections intended to expand and improve the use of Other Transaction Authority (OTA) for prototyping projects.
- Section 1652 (Collection, Storage, and Sharing of Data Relating to Nuclear Security Enterprise) required DoD and the National Nuclear Security Administration (NNSA) to jointly collect and store cost, programmatic, and technical data relating to programs and projects of the nuclear security enterprise and nuclear forces. Responsibility for this collection and storage is assigned to DCAPE and the NNSA Director of Cost Estimating and Program Evaluation.

The NDAA for FY 2017 contains the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 805 (Modular Open System Approach in Development of Major Weapon Systems) required that an MDAP that receives Milestone A or Milestone B approval after January 1, 2019 will be designed and developed, to the maximum extent practicable, with a modular open system approach intended to enable incremental development and enhance competition, innovation, and interoperability. In the modular open system approach, weapon system platforms are developed so that the system design is partitioned into discrete modules that are self-contained, functional elements. The key interfaces among the modules are based on commonly accepted industry standards. This approach permits weapon system platforms to be incrementally upgraded with new components and systems with advanced technologies as they emerge, with minimal effect on the host platform.
- Section 806 (Development, Prototyping and Deployment of Weapon System Components or Technology) provided the military departments with new authorities to mature and demonstrate higher-risk technologies prior to initiating a formal program of record. This section also provided the military departments with new funding and acquisition flexibility to experiment with, prototype, and rapidly deploy weapon system components or other technologies.
- Section 807 (Cost, Schedule, and Performance of Major Defense Acquisition Programs) established a requirement for the Secretary of Defense, or the Deputy Secretary of Defense, to establish program cost and fielding targets for an MDAP before Milestone

A, B, or C approval. The program cost targets are the procurement unit cost and sustainment cost. The program fielding target is the date for IOC.

- Section 808 (Transparency in Major Defense Acquisition Programs) established a requirement for the MDA of an MDAP to provide the congressional defense committees with a brief summary report (or “acquisition scorecard”) no later than 15 days after granting approval at Milestone A, B, or C. The summary report provides certain information about the program pertaining to technical, manufacturing, and fielding risks as well as to cost and schedule. In particular, the summary report includes (1) the program cost and fielding targets described in Section 807, (2) the estimated cost and schedule of the program established by the military department concerned, (3) the statutory independent estimate of the cost of the program, and (4) any independent estimate for the program schedule. The summary and description of the ICE includes an assessment of the major contributors to the program acquisition unit cost and total life-cycle cost.
- Section 842 (Amendments Relating to Independent Cost Estimation and Cost Analysis) provided clarifying amendments to existing statutes for independent cost estimation. At Milestone A, the ICE now includes the identification and sensitivity analysis of key cost drivers that may affect life-cycle costs of the program. In addition, the ICE includes an analysis to support decision-making that identifies and evaluates alternative courses of action that may reduce cost and risk, and result in more affordable programs and less costly systems. Also, CAPE guidance concerning cost assessment procedures for MDAPs establishes a requirement for all cost estimates to include a discussion of risk, the potential impacts of risks on program costs, and approaches to mitigate risk. This discussion of risk is documented in program SARs and in decision documents that approve program baselines. Section 842 also required CAPE, in consultation with USD(A&S), to develop policies, procedures, guidance, and a collection method to ensure that quality acquisition cost data are collected for each acquisition program with a dollar amount greater than \$100 million (which is considerably less than the dollar threshold for an MDAP). These data are to facilitate cost estimation and comparison across acquisition programs. CAPE implementation of this provision is described in Appendix E.
- Section 844 (Review and Report on Sustainment Planning in the Acquisition Process) required the Secretary of Defense to enter into a contract with an independent entity with appropriate expertise to assess the extent to which sustainment matters are considered in decisions related to requirements, acquisition, cost estimating, programming and budgeting, and research and development for MDAPs.
- Section 849 (Improved Life-Cycle Cost Control) made several amendments pertaining to life-cycle cost controls of a program. In particular, the military departments are required to conduct a sustainment review for an MDAP 5 years after declaration of IOC and throughout the system’s life cycle, using availability and reliability thresholds and cost estimates as the triggers that prompt such a review. The sustainment review addresses the program product support strategy, performance, and O&S costs of the system. Each sustainment review also includes a life-cycle cost estimate for the

remainder of the program. Recent CAPE guidance concerning cost estimates for sustainment reviews is described in Chapter II.

- Section 897 (Rapid Prototyping Funds for the Military Departments) authorized the Secretaries of the military department to establish Service-specific funds for the rapid prototyping and rapid fielding pathways established by Section 804 (Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding) of the NDAA for FY 2016.
- Section 901 (Organization of the Office of the Secretary of Defense) modified the position of USD(AT&L) by replacing this position with two new positions: the Under Secretary of Defense for Research and Engineering (USD(R&E)) and USD(A&S). This reorganization became effective February 1, 2018.

The NDAA for FY 2016 contained the following provisions pertaining to defense acquisition policy and cost assessment procedures:

- Section 802 (Role of Chiefs of Staff in the Acquisition Process) enhanced the role of the military Chiefs of Staff in the defense acquisition process. This section also provided specific responsibilities to the Chiefs of Staff and Secretaries of the military departments for balancing resources against priorities on acquisition programs, ensuring that appropriate trade-offs are made among cost, schedule, technical feasibility, and performance throughout the life of each acquisition program.
- Section 804 (Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding) required USD(A&S) to issue guidance that establishes a “middle tier” of acquisition programs that are intended to be completed within 5 years. These programs would fall between “rapid acquisitions” that are generally completed within 6 months to 2 years, and “traditional” acquisition programs that last much longer than 5 years. The guidance for middle tier acquisition addresses two acquisition pathways: (1) rapid prototyping (prototypes with innovative technologies), and (2) rapid fielding (new or upgraded systems with minimal development). This provision also established a DoD Rapid Prototyping Fund to be managed by a USD(A&S) official authorized to transfer funds to the military departments using a merit-based process for selecting prototypes with innovative technologies. Programs in this middle tier are to follow streamlined procedures and are to be exempt from the traditional requirements and acquisition processes. The USD(A&S) guidance for middle tier acquisition establishes a process for transitioning successful prototypes to new or existing programs for production and fielding under the rapid fielding pathway or the traditional acquisition process.
- Section 809 (Advisory Panel on Streamlining and Codifying Acquisition Regulations) called for the Secretary of Defense to establish an independent advisory panel on streamlining acquisition regulations. A Defense Technical Information Center website (discover.dtic.mil/section-809-panel/) provides various reports and recommendations made by the panel from August 2016 through its conclusion in July 2019.
- Section 815 (Amendments to Other Transaction Authority) expanded DoD’s ability to use OTA for certain prototype programs. OTA permits DoD to enter into transactions (other than a contract, grant, or cooperative agreement) with private organizations that are small businesses or nontraditional defense contractors for basic, applied, and

advanced research projects. OTA transactions are exempt from many acquisition and contracting statutes and regulations.

- Section 825 (Designation of Milestone Decision Authority) specified that the MDA for an MDAP reaching Milestone A after October 1, 2016, will be the SAE of the military department managing the program, unless under specific circumstances the Secretary of Defense may designate another official as the MDA.

Appendix G.

CAPE Cost-Estimating Training and Education

DAU Curriculum Review

Over the past several years, CAPE has reviewed and provided detailed actionable feedback on all core DAU cost analysis courses and a large number of continuous learning modules (CLMs), as well courses and CLMs from other curricula with relevant cost analysis content, including contracting and program management. Fiscal year (FY) 2023 represented the first full year that the two-tiered Business-Cost Estimating (BUS-CE) certification and associated training were in place. Coupled with significant Cost and Software Data Reporting (CSDR) organizational, policy, and training updates, CAPE's focus was on working with DAU to ensure that the three Cost Assessment Data Enterprise (CADE) courses described below were updated with the latest information. Now that the other Back-to-Basics (BtB) courses have been deployed, CAPE intends to resume curriculum reviews in FY 2024, appropriately prioritizing between BUS-CE core courses and credentials recently deployed and in development.

CADE Training Courses for Business-Cost Estimating Certification

Three CAPE-developed courses are part of the new two-tiered BUS-CE Certification¹ (Practitioner and Advanced) structure, which is shown in Figure G-1.

¹ https://www.dau.edu/sites/default/files/2023-09/Bus-CostEst_Final.png

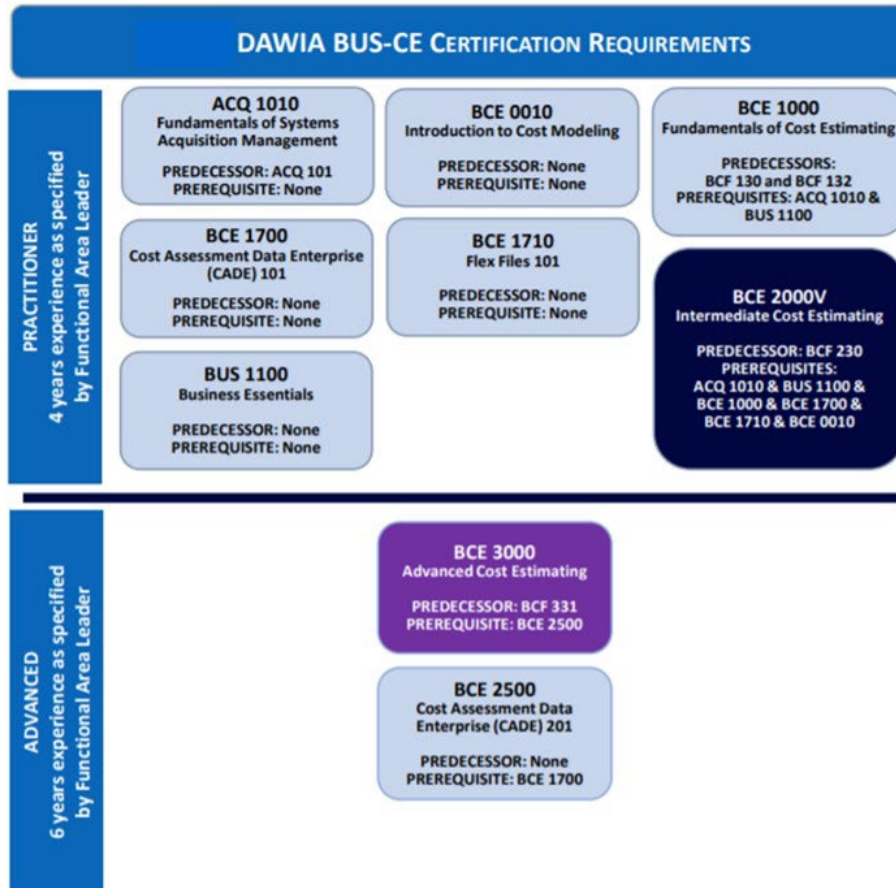


Figure G-1. DAU Courses for Business-Cost Estimating Certification

BCE 1700 (CADE 101) and BCE 1710 (FlexFile 101) are required for the Practitioner level, and BCE 2500 (CADE 201) is required at the Advanced level. These courses are available online via DAU’s Cornerstone on Demand (CSOD) system. Topics covered include:

- Policy and guidance for CSDR
- Data contained in the CSDRs, with an emphasis on the new FlexFile family of reports, but also including the Legacy DD 1921 series holdings
- The CSDR and FlexFile planning, submission, and validation processes
- The value that the data stored in CADE can provide to cost estimators
- Navigation of the CADE portal to retrieve data

In preparing these courses, the CADE Support Team undertook an effort to ensure its alignment to the new BUS-CE Competency Model, which outlines the knowledge and skills that cost estimators are required to learn in order to attain the Practitioner and Advanced levels of certification. The additional required courses for certification are described on the DAU website (<https://www.dau.edu/functional-areas/business-financial-management-and-cost-estimating#tab2>); they are also shown in Figure G-1. Note

that with the BtB transformation, the Cost Estimating career fields transitioned from a three-level to a two-level certification,¹ with a number of courses being moved into the new credentials structure.

Learning Management System and Virtual Courses

In FY 2018, CAPE stood up CADE Learn, a Learning Management System (LMS) on the cloud-based Bridge platform. Bridge is a software application that not only enables the delivery of electronic educational technology (e-learning) courses but also facilitates the management of a holistic CADE training program that includes synchronous courses, webinars, and the CADE Focus Group. The Bridge LMS instructional platform consists of six interactive and informative courses directed toward all manner of CADE users and analysts:

- CADE 101 – Fundamentals of CADE
- CADE 201 – Intermediate CADE Skills
- FlexFile 101 – The Future of Cost Reporting
- CADE for Submitters
- CADE for Contracting Officers
- CADE for the Program Managers

The courses contain multiple interactive elements tailored to active CADE users and other members of the acquisition community. By making the CADE training material available via the LMS, CAPE can provide on-demand training to a much broader segment of the workforce. Whether accessed online or via virtual course offerings, this CADE-related training can be used by analysts to earn continuous learning points (CLPs) toward Defense Acquisition Workforce Improvement Act and Department of Defense Financial Management (FM) certifications.

Office Hours

The CADE Training Team now provides a monthly online session as an office hours format that provides CADE users with an opportunity to engage directly with subject matter experts on a predetermined topic. Recent past sessions addressed the CADE Data and Analytics Application, FlexFile Export Options in CADE, the Quantity Data Report, and the Software Resources Data Reporting reports. Participants can submit questions in advance for discussion during the office hours.

¹ <https://www.dau.edu/sites/default/files/2023-09/Certification%20Crosswalk%20BUS-CE.pdf>

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Appendix H.

Sustainment Reviews in FY 2021 and FY 2022

As noted in Chapter II, each sustainment review for a major weapon system is required to be supported by an independent cost estimate (ICE) for the remainder of the program's life cycle. For fiscal year (FY) 2021, Cost Assessment and Program Evaluation (CAPE) elected to delegate responsibility for all ICEs to the DoD Components. Table H-1 summarizes the 13 ICEs prepared for sustainment reviews in FY 2021.

Table H-1. ICEs in FY 2021 for Sustainment Reviews

Program Name	DoD Component	ICE Date	Review Date	Critical O&S Growth
Bradley Fighting Vehicle M2A3/M3A3	Army	1/4/2021	2/2/2021	
Ch-47F Block I	Army	3/8/2021	4/6/2021	Yes
MaxxPro Family of Vehicles	Army	3/19/2021	4/20/2021	
Guided Multiple Launch Rocket System	Army	6/8/2021	8/18/2021	Yes
C-130J	Air Force	6/10/2021	8/17/2021	
F-15E	Air Force	6/10/2021	8/17/2021	
F-16C/D	Air Force	6/10/2021	8/17/2021	
KC-135	Air Force	6/10/2021	8/17/2021	
MQ-9A	Air Force	6/10/2021	8/17/2021	
B-1B	Air Force	6/14/2021	8/17/2021	
B-2A	Air Force	6/14/2021	8/17/2021	
B-52H	Air Force	6/14/2021	8/17/2021	
E-3	Air Force	6/14/2021	8/17/2021	

Although CAPE did not review and comment on each individual sustainment ICE, it did provide an overall assessment of the ICEs to the Army and Air Force at the end of the fiscal year. CAPE identified issues with the data collection, analytic methods and documentation of results supporting the sustainment reviews. CAPE provided the Army and Air Force with specific recommendations to address these issues to improve future sustainment reviews. Of note, some programs lacked cost reporting for contractor logistics support (CLS) contracts. Although progress in this area has been made for many programs, others programs with CLS contracts lack the cost reporting granularity needed to improve cost estimation for sustainment of fielded and future programs. The Navy did not perform sustainment reviews in FY 2021 but did initiate them in FY 2022.

Table H-2. ICEs in FY 2022 for Sustainment ReviewsH-2 summarizes the 21 ICEs prepared for sustainment reviews in FY 2022.

Table H-2. ICEs in FY 2022 for Sustainment Reviews

Program Name	DoD Component	ICE Date	Review Date	Critical O&S Cost Growth
Warfighter Information Network - Tactical	Army	3/17/2022	3/24/2022	Yes
Excalibur	Army	4/22/2022	4/28/2022	Yes
Hellfire AGM-114K/AGM-114L	Army	5/6/2022	5/15/2022	
Common Remotely Operated Weapon Station	Army	5/17/2022	5/31/2022	Yes
H-60A/L/M/V Blackhawk	Army	6/8/2022	6/16/2022	
Tactical Mission Command	Army	6/14/2022	7/13/2022	Yes
RQ-7B Shadow	Army	6/15/2022	6/23/2022	
Patriot System of Systems	Army	7/8/2022	7/18/2022	
Cooperative Engagement Capability	Navy	3/17/2022	3/23/2022	
KC-130J	Navy	3/31/2022	4/21/2022	
Tactical Tomahawk Missile	Navy	6/6/2022	6/29/2022	
T-45 Training System	Navy	6/16/2022	7/27/2022	
Navy Multiband Terminal	Navy	8/4/2022	8/18/2022	Yes
Littoral Combat Ship	Navy	8/9/2022	8/10/2022	
F/A-18E/F & EA-18G	Navy	8/25/2022	8/29/2022	Yes
Joint Direct Attack Munition	Air Force	6/14/2022	7/29/2022	
C-5M	Air Force	7/27/2022	7/29/2022	
F-22A	Air Force	7/27/2022	7/29/2022	
T-6	Air Force	7/27/2022	7/31/2022	
HC/MC-130J	Air Force	7/27/2022	8/4/2022	
E-4B	Air Force	7/27/2022	8/5/2022	

*The Navy ICE was revised on 7/19/2022 based on suggested actions recommended by CAPE after the 3/23/2022 sustainment review.

Abbreviations

ACAT	Acquisition Category
ADM	Acquisition Decision Memorandum
AFCAA	Air Force Cost Analysis Agency
AFIT	Air Force Institute of Technology
AFLCMC	Air Force Life Cycle Management Center
AFNWC	Air Force Nuclear Weapons Center
AFSC	Air Force Sustainment Center
AFTOC	Air Force Total Ownership Cost
AMCOM	Aviation and Missile Command
AMPV	Armored Multi-Purpose Vehicle
AMRAAM	Advanced Medium-Range Air-to-Air Missile
AoA	Analysis of Alternatives
APUC	Average Procurement Unit Cost
AUKUS	Australia, United Kingdom, United States (a trilateral security partnership)
BtB	Back to Basics
BUS-CE	Business-Cost Estimating
CADE	Cost Assessment Data Enterprise
CAE	Component Acquisition Executive
CAPE	Cost Assessment and Program Evaluation
CARD	Cost Analysis Requirements Description
CCDR	Contractor Cost Data Reporting
CCP	DoD Component Cost Position
CE	Cost Estimating
CE&A	Cost Estimating and Analysis
CECOM	Communication-Electronics Command
CLIN	Contract Line Item Number
CLM	Continuous Learning Module
CLP	Continuous Learning Point
CLS	Contractor Logistics Support
CSDR	Cost and Software Data Reporting
CSM	Contract Services Management

CWIPT	Cost Working Integrated Product Team
DAB	Defense Acquisition Board
DAF	Department of the Air Force
DASA-CE	Deputy Assistant Secretary of the Army for Cost and Economics
DAU	Defense Acquisition University
DAVE	Defense Acquisition Visual Environment
DAWIA	Defense Acquisition Workforce Improvement Act
DCAPE	Director of Cost Assessment and Program Evaluation
DCARC	Defense Cost and Resource Center
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DMDC	Defense Manpower Data Center
DOC	Director of Cost Estimating and Analysis
DoD	Department of Defense
DoDCAS	Department of Defense Cost Analysis Symposium
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DoDM	Department of Defense Manual
DoN	Department of the Navy
DTMHub	Datasets, Tools, and Models Hub
EMD	Engineering and Manufacturing Development
ERP	Enterprise Resource Planning
EV	Earned Value
EVAMOSOC	Enterprise VAMOSOC
EVM	Earned Value Management
E-XX	EA-6B Recapitalization
FCoM	Full Cost of Manpower
FM	Financial Management
FMS	Foreign Military Sales
FRP	Full-Rate Production
FY	Fiscal Year
FYDP	Future Years Defense Program
GCSS-A	Global Combat Support System - Army
GCSS-MC	Global Combat Support System - Marine Corps

IAMD	Integrated Air and Missile Defense
ICE	Independent Cost Estimate
IOC	Initial Operational Capability
IPM	Integrated Program Management
ISD	Instructional System Designers
JASSM	Joint Air-to-Surface Standoff Missile
LMP	Logistics Modernization Program
LMS	Learning Management System
LRASM	Long-Range Anti-Ship Missile
MCSC	Marine Corps Systems Command
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MOA	Memorandum of Agreement
MSAR	Modernized Selected Acquisition Report
MTA	Middle Tier of Acquisition
MYP	Multiyear Procurement
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NAVWAR	Naval Information Warfare Systems Command
NCCA	Naval Center for Cost Analysis
NCD	Naval Cost Division
NDAA	National Defense Authorization Act
NNSA	National Nuclear Security Administration
NPS	Naval Postgraduate School
NRO	National Reconnaissance Office
O&M	Operations and Maintenance
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
OTA	Other Transaction Authority
PAUC	Program Acquisition Unit Cost
PEO	Program Executive Officer
PMO	Program Management Office

POM	Program Objective Memorandum
RFP	Request for Proposal
RV	Reentry Vehicle
S&A	Studies and Analysis
SAE	Service Acquisition Executive
SAR	Selected Acquisition Report
SIB	Submarine Industrial Base
SIPRNet	Secure Internet Protocol Router Network
SM-3	Standard Missile 3
SM-6	Standard Missile 6
SSC	Space Systems Center
SRDR	Software Resources Data Reporting
SYP	Single-Year Procurement
TACOM	Tank-automotive and Armaments Command
U.S.C.	United States Code
USD(A&S)	Under Secretary of Defense (Acquisition and Sustainment)
USD(R&E)	Under Secretary of Defense (Research and Engineering)
USMC	United States Marine Corps
VAMOSOC	Visibility and Management of Operating and Support Costs
VCS	Virginia Class Submarine
WBS	Work Breakdown Structure
WSARA	Weapon Systems Acquisition Reform Act of 2009