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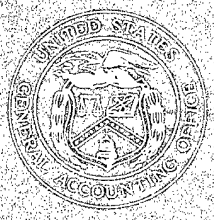
MAJOR ACQUISITIONS

Significant Changes Underway in DOD's Earned Value Management Process



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The Honorable Rick Santorum
Chairman
The Honorable Joseph I. Lieberman
Ranking Minority Member
Subcommittee on Acquisition and Technology
Committee on Armed Services
United States Senate

Despite the regularity with which defense acquisition programs have experienced cost overruns and schedule delays, the Department of Defense (DOD) does have an extensive system intended to provide program managers and others with early warnings of cost and schedule problems. In 1967, DOD issued a set of cost/schedule control system (CS^2) criteria that it required defense contractors to meet. However, it has become widely accepted by DOD and the defense industry alike that this process is in need of reform. This report addresses the problems facing the CS^2 process, the progress DOD has made with reforms, and the challenges DOD faces in fostering and managing potentially significant changes.

Background

DOD's CS^2 was established in 1967 as a tool to measure the value of work performed as compared to the actual costs, a concept referred to as earned value. Earned value goes beyond the two-dimensional approach of comparing budgeted costs to actuals. It attempts to compare the value of work accomplished during a given period with the work scheduled for that period. By using the value of work done as a basis for estimating the cost and time to complete, the earned value concept should alert program managers to potential problems sooner than expenditures alone can.

To illustrate, assume a contract calls for 4 miles of railroad track to be laid in 4 weeks at a cost of $4 million. After 3 weeks of work, only $2 million has been spent. By analyzing planned versus actual expenditures, it appears the project is underrunning the estimated costs. However, an earned value analysis reveals that the project is in trouble because even though only $2 million has been spent, only 1 mile of track has been laid; thus, the contract is only 25 percent complete. Based on the value of work done, the project will cost $8 million ($2 million to complete each mile of track) and the 4 miles of track will take a total of 12 weeks (3 weeks for each mile of track) to complete instead of the originally estimated 4 weeks.

The communities that have a vested interest in earned value generally and C/S^2 specifically are the (1) program managers, who are charged with overall management responsibility for acquisition programs; (2) contractors, who are responsible for successful execution of the contract; and (3) overseers, such as acquisition executives, financial managers, contract surveillance officials, and cost estimators who are tasked with tracking and estimating program costs. For earned value to be effective, it must serve the basic needs of all these users. An engineer might consider its most useful output to be technical status information on particular components. An accountant may view its most important product to be the cost versus budget information it provides. A program manager may share both views or may value the scheduling data the most. Thus, regardless of the system or process used to record information, earned value should provide insightful information to all three communities.

In its 1967 financial management regulations, DOD issued 35 C/S^2 criteria that were to be applied to most major weapon acquisitions (see app. I for a listing of the criteria). The criteria are not an accounting system per se, but rather general management or internal control guidelines to be used on flexibly priced[1] contracts. The criteria require that the contractor's management control system provide data that (1) relate time-phased budgets to specific contract tasks; (2) indicate work progress; (3) properly relate cost, schedule, and technical accomplishment; (4) are valid, timely, and auditable; (5) supply managers with summary level information; and (6) are derived from the same internal management control systems used by the contractor.

Over the years, the basic criteria were supplemented by additional guidance and procedures for contractor system reviews and reporting, which have become "de facto" requirements. For example, the government conducted a series of implementation and surveillance reviews of contractors' management control systems to ensure they complied with the criteria. In 1972, DOD developed a Joint Implementation Guide to standardize C/S^2 implementation procedures. The guide contained a checklist of about 160 specific questions, which were referred to as subcriteria, to be covered with contractor employees during the implementation reviews. These requirements converge with other requirements in determining how a contractor designs its management

[1]Flexibly priced contracts include all types of cost reimbursable contracts and those fixed-price contracts with incentive fee arrangements. Contracts not having such arrangements are called firm fixed price. The C/S^2 requirement must be imposed on flexibly priced contracts with a value of $70 million in research, development, test, and evaluation and $300 million in procurement.

control system. For example, DOD independent cost estimators have required a different breakout of contractor cost information than the CS^2 did and have specified that cost data be collected in uniform or consistent categories. The contractor's system must be elaborate enough to satisfy all of these data requirements, regardless of their source or purpose.

Results in Brief

The core concept of the CS^2 process—earned value—is recognized as a sound way to measure progress on major acquisition programs. Over the years, however, the process has evolved to where the needs of some of its key users are being satisfied, while others are not. Specifically, DOD program managers are not satisfied with the timeliness of the CS^2 reports. Because the data contained in the reports are typically up to 2 months old, the reports do not function as an early warning system needed by program managers. Moreover, the process has not fully integrated cost, schedule, and technical data as intended. The want of such information can invite subjective and potentially optimistic judgments to fill the void. Contractors maintain that accommodating extensive government certification reviews, collecting and arraying data in prescribed categories, and preparing detailed reports requires significant effort and cost to the government and draws some of their engineering resources away from program execution. Commercial firms that use earned value systems produce reports more frequently, more quickly, and in less detail than the CS^2 process. Users outside the program offices—such as financial managers and cost estimators—find that the data generally meets their needs. These users generally place more value on consistency among cost categories and less value on timeliness than program managers.

DOD has acknowledged the problems with CS^2 for a decade, but reforms have proceeded slowly mainly because responsibility for the process has resided with the oversight organizations that have been its architects. DOD attempted to effect change in 1989 by transferring top-level responsibility for the system from the comptroller staff to the acquisition staff. Despite this transfer, little progress was made because execution of CS^2 at the field level remained within the comptroller community. Nonetheless, DOD has embarked on several reforms that could dramatically change the CS^2 process. Recently, DOD accepted industry's earned value management criteria as a replacement for the government's long-standing CS^2 criteria. DOD has also transferred responsibility and control over the process from the services to the Defense Contract Management Command (DCMC), which currently provides the on-site interface between the government program office and the contractor. Another reform underway involves

giving DOD program managers latitude to tailor their contract data to the specific needs of their program—such as the categories and the level of detail. In many cases, program managers are using direct (on-line) access to obtain data from the contractors' internal management information systems.

These recent steps to reform the CS² process have potent implications. For example, adopting the industry criteria could result in less burdensome and more useful contractor management information systems, but could also lessen the government's ability to oversee defense programs. In light of both the day-to-day demands of managing the process on individual contracts and implementing recent reforms, DCMC faces a significant challenge as it takes over stewardship of the process. Service officials are concerned about how quickly it can meet these demands, given its decline in staffing over the last several years. Ultimately, DCMC will have to ensure that the process meets the basic needs of all its key users—program managers, contractors, and oversight personnel.

The CS² System Has Served Oversight Needs Better Than Program Management Needs

An earned value system faces stiff and somewhat competing demands from its users: (1) providing the right analyses in time for program managers to use; (2) enabling adequate oversight and analysis of multiple programs beyond the program office level; and (3) minimizing the effort required of the contractor to provide the necessary systems, data, and analysis. DOD policy states that earned value is an integrated program management tool, but because it has historically been a comptroller function, CS² has been viewed by other users as a compulsory and burdensome financial reporting system. Moreover, it has not fully satisfied the needs of many program managers for up-to-date and integrated information on cost, schedule, and technical progress.

Program Managers: Timeliness of CS² Data Limits Its Utility

Government program managers are responsible for managing the cost, schedule, and technical performance of their weapon acquisition programs. The CS² process was designed to integrate these three parameters into an effective early warning tool. However, program managers have historically expressed concerns that CS² data, as reported, are too late and too voluminous to be useful for day-to-day program management. The primary CS² report, the cost performance report, can be up to 60 days old and can contain over 100 pages of detailed information. We confirmed that many program managers still see data timeliness as an issue. According to some managers, using CS² data is like "managing by

looking through a rear view mirror." DOD acknowledged some of these issues in the 1987 preface to the Joint Implementation Guide.

We contacted managers of Acquisition Category 1D[2] programs in engineering and manufacturing development to evaluate whether the CS[2] data met their needs. Their comments disclosed that while they strongly support the concept of earned value, the timeliness of the data is still a significant concern. Ten of the 15 program managers who responded believed that the data were delivered too late to be an effective real-time management tool. Twelve of these managers responded that the cost performance reports did not contain problems they were not previously aware of. One manager stated that because the reports are between 30 and 90 days old, he usually winds up addressing long resolved issues, which creates unnecessary work for him. Another expressed the concern that by the time the report reaches him, the problem is usually worse. Part of the problem is that the CS[2] system is driven by users in an oversight, not in a program execution role, another stated.

When the CS[2] reporting requirements were initially generated in 1967, the data were as timely as commonly available technological tools would allow. The work was broken out into short, discrete work packages and grouped into cost accounts. Engineers in the contractor's plant were often made responsible for managing and reporting on these cost accounts each month. This information was accumulated, consolidated at the contractor's plant, and mailed to a variety of offices within DOD. Financial analysts within DOD then reviewed and entered this data into software applications for further analysis. By this time, the data were at least 2 months old.

Technological advances have eliminated the need for government analysts to manually enter the data; nevertheless, many program offices still rely on the mail to obtain the report in hard copy or on a diskette. Program managers are not satisfied with the timeliness of these reports. With the advent of readily accessible real-time communication tools like personal computers, electronic mail, and the Internet, however, program managers are unwilling to wait 2 months for program status information. Because of this time delay, program managers generally use other means to satisfy their needs for information, like integrated product teams. With

[2]An acquisition category 1 program is defined as a major defense acquisition program with estimated expenditures of over $355 million in research, development, test, and evaluation, or over $2.135 billion in procurement (in fiscal year 1996 dollars). A category 1D program is monitored by the defense acquisition executive, not a service executive. At the time of our review, there were 16 category 1D programs in engineering and manufacturing development.

technological advances in communication, program managers can directly access contractor data on a real-time basis. This type of access allows the government program manager to analyze and react to the same vintage information the contractor is using to manage.

In addition to timeliness problems, the CS² reports emphasize the cost and, to some extent, the schedule data without fully integrating technical information. Assessment of technical risks is left to subjective, often optimistic judgments of program personnel. One of the managers we surveyed pointed out that CS² does not show if the technical performance is being achieved or if the work on the critical path is being done on time or within cost. In other words, even though a discrete work segment may be completed, CS² data do not directly inform a manager of the success or quality of the work. Instead, the standard cost performance report attempts to assign a cost value to schedule data. Thus, if a particular design task has fallen behind schedule, the standard report would assign a cost to the delay and present that cost. While this format may be ideal for a cost analyst, it cannot by itself facilitate the timely management of a technical problem, nor can it highlight the potential impact on critical path schedules.

Another limitation is that the detailed data collection categories may not correspond to individual program structures. Although the need for overall reporting consistency is critical to the oversight community, program managers are willing to accept progress information presented in the same categories and format that the contractor uses to manage the program. Most program managers we surveyed were interested in obtaining real-time data directly from the contractor in whatever format the contractor used, as long as the format remained consistent and the data could be verified. According to DOD officials, program managers have had the flexibility to modify reporting requirements for many years, but the needs of the oversight community for consistent reporting formats and categories have taken precedence. Many of the program managers we contacted are now taking advantage of this flexibility to tailor their reporting requirements. DOD officials stated that these limitations reflect more on how the CS² criteria and cost estimating requirements have been implemented than on the criteria themselves. They noted that the CS² criteria allow such flexibility but that subsequent reporting and certification procedures have led to rigid implementation practices.

Contractors: CS² Validation and Reporting Are Burdensome

Although contractors generally recognize the basic CS² criteria as sound management principles, they believe DOD's implementation process contains many burdensome requirements. Independent studies have found that CS² reporting was too detailed, repetitive, and voluminous to be used effectively as a management tool either by the government or by industry. Further, they found that the requirement may actually undermine program performance by diverting the time and attention of the company program manager.

The formal reports represent only the end product of what is required in CS². Perhaps more significant are the cost and management control systems the contractors must have in place to record the required information and the government reviews of those systems to certify their acceptability. To facilitate cost estimating, DOD guidance specifies a structure for breaking the work down on developing a major weapon into uniform categories or segments. At the most basic level, CS² guidance requires that the work is broken down into discrete short-span work packages, which are consolidated into a cost account. A cost account is a management control point at which actual costs can be accumulated for an element of work. Table 1 illustrates an excerpt of a work breakdown structure for an ongoing aircraft program.

Table 1: Work Breakdown Structure for an Aircraft Program

Level 1: Aircraft
Level 2: Air vehicle
Level 3: Avionics
Level 4: Communication/navigation/identification
Level 5: Navigation software
Level 6: Individual cost accounts

Source: DOD.

Cost accounts on complex weapon programs can number over 1,000. While these costs have to be recorded and tracked by the contractor at some level, cost-estimating requirements in conjunction with CS² implementation practices have dictated how the accounts are defined and at what level of detail. For example, if a contractor's internal management system differs from the cost-estimating structure, the contractor may have to track costs one way to satisfy cost-estimating requirements and another way to match how it actually manages. This requires more engineering

effort by the contractor because it is the technical staff who typically manage the cost accounts.

For example, in aircraft programs, DOD requires contractors to record and report earned value information for the aircraft sections. However, they could be managing by aircraft ribs (structural components that strengthen larger airframe sections). To satisfy DOD's requirements, these contractors would have to artificially segregate costs for ribs going to the fuselage from those going into the wings and tail sections. They would also have to prepare lengthy CS² variance reports, which takes them away from their engineering duties and provides information that does not directly relate to how the program is being managed.

The standardization that work breakdown categories provide may facilitate government analysis and oversight above the program level, but may not aid—and in fact could inhibit—program management. DOD policy has given program managers the flexibility to modify the level of detail in CS² reports and more recently, the prescribed work breakdown categories. Program managers have used this latitude in modifying their CS² reporting requirements and are tailoring their reporting requirements. However, the contractors still track costs according to the standardized work breakdown structure to satisfy the cost estimators' needs for data consistency. Recently, the Cost Analysis Improvement Group, an organization that provides independent program cost estimates to the Secretary of Defense, has taken steps to clarify the needs of the cost-estimating community with respect to those of CS². The group, which relies on actual cost data from contractor accounting systems, has reemphasized the need for consistent cost reporting while reducing the burden on contractors. Accordingly, the group is in the process of improving its reporting systems to allow contractors to report in their own formats and appropriate level of detail, using a common data format that in turn enables DOD to convert the data into the format needed by the cost-estimating group.

The requirement to have management control systems that comply with CS² criteria is contained in the basic weapons system contract. However, the detailed requirements for these systems have been established through an extensive certification process. During the certification reviews, the government used a checklist of 158 specific questions to assess compliance at all levels of the contractor organization. The various reviews conducted on the contractor system during the life of a contract

are summarized in table 2 below, along with estimates of the resources involved.

Table 2: Traditional CS² Compliance Reviews

Review title	Purpose of review	Days	Staff
Implementation visit	Contractor plans to implement CS²	2-3	4-5
Readiness assessment	CS² implementation progress	5	5-15
Demonstration review	Compliance of contractor management control systems	15-20	10-25
Extended subsequent application review	Revisions to management control system	10-15	10-25
Subsequent application review	New contract application of CS² requirements	5	6-10
Baseline review	Proper implementation of contract baseline	3	4-6

Source: Cost/Schedule Control System Criteria, The Management Guide to C/SCSC; Quentin W. Fleming; 1992.

The time and staff required for these reviews can vary, depending upon the complexity of each contract. In addition to the government personnel required to perform these reviews, an even larger number of contractor personnel may be required to support the reviews, which adds to the cost of a contract. For example, cost account managers are interviewed during the demonstration review, using the checklist of 158 questions. Because the CS² implementation guidance dictates that work be segregated into small, short work packages, this could entail numerous contractor staff. In addition, once a contractor's system has been validated by the government, it is then subject to periodic surveillance reviews that are performed throughout the life of the contract. Contractors ultimately viewed the government-approved management system as one that the government had imposed upon them. They could not redesign or modify such a system without first getting government approval. If a change were approved, the government would initiate another system review to revalidate the revised system. Contractors would thus shun system improvements to avoid the additional reviews.

Financial Management: CS² Is Satisfactory

Because the financial management community has presided over the evolution of CS² for most of the past 30 years, the system has been optimized to meet its needs. The initial regulation governing CS² policy, DOD Instruction 7000.2, was issued by the DOD Comptroller as part of the

financial management regulations.[3] It was implemented and administered by an infrastructure of DOD financial managers. This infrastructure permeates all levels of DOD. At the program office level, analysts review the reports, participate in contractor system reviews, and monitor contract progress. At the buying command and at service headquarters, financial managers were in charge of the various contractor system reviews, analyzing the reports, and projecting trends and estimates to complete. At the Office of the Secretary of Defense, cost analysts and program oversight personnel still review this data in support of major milestone decisions and through periodic oversight reports like the Defense Acquisition Executive Summary. At the contractor's plant, DCMC representatives participate in the system reviews, provide on-site surveillance and review the reports for accuracy. Until December 1995, the Performance Measurement Joint Executive Group, comprised of financial management experts, was the chief decision-making body for C/S^2 issues.

The role played by the financial management community is somewhat unique to the federal government. Unlike the commercial world, where the company developing a new product funds the development with its and/or investors' money, weapon system development is funded by the government—the customer. The government acts as an agent for the public trust and therefore has a responsibility to oversee the expenditure of those funds. The cost performance report, as one of the main reports to assist the government in that responsibility, provides auditable data from which an analyst can generate independent estimates at completion and may also project trends based on contract performance. Historical cost data from the contractor's systems also enable estimators to develop parametric models from which future weapon systems' cost can be estimated. Consistent with these needs, the financial management community, in its stewardship over the C/S^2 process, has placed a premium on reliable and consistent cost data.

The cost analyses performed on weapon acquisition programs are an important internal control that can highlight performance problems that program managers, as advocates, may overlook. The controversy and subsequent cancellation of the Navy's A-12 aircraft illustrates the value of C/S^2 data being available to organizations outside the program manager's office. According to the 1990 administrative inquiry conducted for the Secretary of the Navy, the cost performance data from the A-12 contractors clearly indicated significant cost and schedule problems. The

[3]In 1991, DOD Instruction 7000.2 was canceled and its requirements included in DOD Instruction 5000.2, Defense Acquisition Management Policies and Procedures. This regulation was superseded in 1996 by DOD Regulation 5000.2-R, Mandatory Procedures for Major Defense Acquisitions.

results of an oversight review of the cost performance reports disclosed that the A-12 contract would probably exceed its ceiling by $1 billion. However, neither the contractors nor the Navy program manager relied upon this data; instead, they used overly optimistic recovery plans and schedule assumptions. The inquiry concluded that the government and contractor program managers lacked the objectivity to assess the situation and they disregarded financial analysts who surfaced the problems.

Commercial Firms Use Streamlined Earned Value Process

Commercial firms are increasingly adopting the concept of earned value for development projects but are applying it in a more streamlined manner than DOD has historically. Company managers are getting real-time progress information in formats consistent with how they manage. Major defense contractors are also overwhelmingly emphasizing up-front technical planning and scheduling as opposed to traditional cost and schedule monitoring. United Defense Limited Partnership, a major defense contractor, has inserted earned value concepts throughout its entire management structure. A senior official from that company stated that a successful program hinges on good technical planning and scheduling, and for earned value to succeed, it must be useful to everyone, not just a requirement imposed onto one functional group by another. It must also be used to manage internally or it will not be taken seriously by those operating it.

Motorola is also convinced that technical planning and scheduling is paramount to a successful project. It is using earned value to manage its multi-billion dollar satellite communication system, IRIDIUM®, with streamlined data accumulation, reporting, and oversight mechanisms. For example, technical and schedule data are monitored at very detailed levels whereas costs are not included until much higher levels of reporting are reached. Similarly, Lockheed-Martin Missiles and Space has announced it is adopting earned value for all its contracts, regardless of whether the customer is military or commercial. Lockheed-Martin has benchmarked its processes and identified the best practices in program management. It estimates that by adopting these practices for each contract, it could reduce its non-value added activities by almost two-thirds.

When a firm like Motorola makes large investments in a major development like IRIDIUM®, detailed information requirements are essential, and in many ways, similar to DOD's. According to the firms we spoke with who are funding major product developments and are using an earned value system, they produce internal status reports more frequently,

with less detail, that are more current than what the traditional CS² process has provided to DOD. They also place emphasis on technical and schedule planning. Moreover, the manner in which the data is organized and reported is typically aligned with the way the companies manufacture. Government program managers we contacted indicated that this is precisely what they want—real-time information presented in a manner that mirrors how the contractor manufactures.

The major differences between commercial earned value practices and traditional defense practices are shown in table 3.

Table 3: Comparison of Commercial Earned Value to Traditional Defense CS² Implementation Practices

Characteristic	Commercial program	Traditional DOD program
Frequency of status reports	Weekly/bi-weekly	Monthly
Age of information	Real-time/weekly	Up to 60 days after reporting period ends
Method of data dissemination	Direct access to database	Mailing of reports on paper or disk
Work breakdown structure	Level 3	Level 3-7
Variance analysis reporting	Critical path items	All elements
Management focus	Technical and schedule	Costs

As indicated, commercial firms obtain data much more frequently than DOD programs typically do. Program status information was available to commercial managers on either a real-time basis or as close as the companies' computer capabilities would allow. Another significant difference is that variance analysis reporting is much less detailed in commercial firms. Companies set tolerance limits within appropriate manufacturing processes and report on breaches of those limits as opposed to reporting on all variances regardless of the element. If the element is not critical to meeting technical progress, schedule, or cost, it may be monitored but not necessarily reported.

Management emphasis differs between the two groups, as well. We found that on commercial programs, the manufacturers tended to focus on adherence to schedule as opposed to costs. They do not forsake the other benefits of earned value but focus on technical and schedule goals before costs. Their philosophy is that focusing on key technical accomplishments per the planned schedule will cause planned costs to fall in line. For example, in the IRIDIUM® program, Motorola did not add costs to the program status reporting until almost halfway up the reporting channel, a much higher level of aggregation than a typical DOD program. Company

management reasoned that because engineers and program managers on the manufacturing floors are concerned with meeting technical and schedule accomplishment, recording earned value information at that level is more informative in terms of labor hours than in terms of dollars. DOD officials believe that the CS² criteria and basic guidance allow defense programs the flexibility to manage earned value information in a similar manner, but in practice, this flexibility has been limited by over implementation of the guidance.

Some Early Reforms Have Made Limited Impact

Despite DOD's acknowledgement of CS² implementation problems, until recently, little progress has been made in resolving them. Fundamentally, this is because the CS² data was responsive to the financial management community that managed how the CS² process was implemented. Most of the reforms that have been undertaken have made improvements, but have not alleviated the more significant problems with CS². The integrated baseline review, however, may prove to be an exception because it has resulted in a marked reduction in traditional CS² oversight reviews thus far.

The 1987 Joint Implementation Guide clarified the objectives of CS² as "For contractors to use effective internal cost and schedule management control systems, and for the government to be able to rely on timely and auditable data produced by those systems for determining product-oriented contract status." It went on to stress that improved communication between the government and contractors could reduce improper implementation of the CS² criteria. To stimulate reform, DOD transferred the responsibility for CS² policy from the DOD Comptroller to the Under Secretary of Defense for Acquisition in August 1989. This top-level organizational change was not mirrored in the three services, however. As a result, CS² implementation was fragmented, with top-level policy being managed by the Office of the Secretary of Defense acquisition community and day-to-day implementation being managed by the services' financial management community. The Performance Measurement Joint Executive Group, comprised of financial management personnel, maintained central oversight of the CS² process.

In October 1993, the Under Secretary of Defense for Acquisition & Technology undertook an initiative to return earned value to its original purpose: a tool to integrate cost, schedule, and technical performance management. This initiative attempted to reduce the review burden and limit reporting requirements. In addition, to change the emphasis from government oversight to contractor responsibility, it encouraged industry

to develop its own management standards. About a year later, after limited progress, the Office of the Secretary of Defense requested that the Service Acquisition Executives personally revitalize CS² reform under the Integrated Program Management Initiative. A top-level Executive Steering Group was formed to reengineer earned value implementation among the services. This group noted that while there were no exceptions to the CS² requirement, there was broad latitude to change implementation practices. DOD and recent service policy memoranda have consistently stressed the need to streamline traditional CS² reporting requirements by reducing the detailed information required, such as minute categories for reporting and tailoring other report formats. In December 1993, DOD initiated a major effort to revise the Joint Implementation Guide. After multiple iterations and coordination difficulties, it was finally reissued in December 1996.

To provide more timely information to program managers, DOD is requiring all new contracts to use electronic data interchange (EDI) as a data transfer method. Under the EDI concept, the contractors will make the cost performance reports, along with other reports, electronically accessible to program managers, financial analysts, and other users like DCMC staff. To ensure that the cost performance report data can be transmitted and received in common data formats, DOD has developed a standardized data set for contractors to use when transmitting their reports.

One of the benefits of using EDI for cost performance reporting is the time saved by electronically transmitting data to customers instead of physically mailing written reports. The time savings has been estimated at about 1 to 2 weeks, which includes time associated with re-keying information into the customers databases so they can perform their analyses. Notwithstanding some of the problems that are being encountered with electronic transfers of data, we believe the time savings associated with this method of communication is not likely to make the reports more useful. At best, the reports will still be received by the program offices and other interested users about 30 to 45 days after the end of a reporting period.

One of the more successful initiatives to date is the integrated baseline review (IBR), which DOD implemented in 1994. The IBR focuses on the development of a detailed and achievable technical, cost, and schedule baseline for a program. The objectives of the IBR are twofold: to improve the use of cost performance data by contractor and government program managers and to reduce the number of CS² reviews. As part of the overall risk assessment process, the IBR is intended to integrate the technical

content of the work with cost and schedule parameters. It is planned and executed by a multi-functional government and contractor team composed of engineering, logistics, manufacturing, contracting, and financial personnel. Unlike traditional CS² baseline reviews, the IBR is led by the program manager, not a financial manager. By involving the program manager directly in this review, the process highlights the merits of using earned value to track progress. It has also reduced the number of CS² compliance reviews. For example, CS² reviews have decreased from 56 in 1993 to 5 in 1995 while the number of IBRs have increased from 3 in 1993 to 29 in 1995. The program managers that we surveyed strongly supported the IBR as a valuable program management tool.

Recent Reforms Have Major Implications for CS² Process

DOD has recently taken a three-pronged approach to reform the CS² process. This approach includes an internal organizational realignment to override cultural resistance to change, the recognition of commercial industry criteria to return the management of the system to the contractor, and direct electronic access by program managers to contractor information to improve the timeliness of CS² data. These changes may have significant impact on the extent, type, and number of CS² system reviews that occur; the interpretation of how the criteria/guidelines will be implemented; and the extent and timeliness of data received by government managers.

Organizational Restructuring Shifts CS² Stewardship Away From Financial Management Community

In December 1995, DOD disbanded the Performance Measurement Joint Executive Group and made DCMC the executive agent for CS² issues. Policy matters are now handled by the Executive Steering Group, which includes representatives from the Service Acquisition Executives and the DCMC Commander, to provide a program management orientation. In October 1996, the Under Secretary of Defense for Acquisition and Technology formally transferred CS² compliance responsibility from the services to DCMC. This latest decision completes the transfer of virtually all CS² policy, reform, and compliance decisions away from the financial management community. Nonetheless, members of the various communities will continue to be involved in the day-to-day operations of CS². How their roles, practices, and interaction with one another will change under the aegis of DCMC remains to be seen.

This transfer has significant repercussions for DCMC. Service representatives have expressed concern that because of its recent downsizing, DCMC may not have the resources to adequately perform its

increased responsibilities. In addition, about 85 percent of the CS² field staff dedicate only part of their time to cost performance monitoring. DCMC officials are aware of these concerns and are working on a strategy to accomplish its newly expanded mission. Since it is likely that DCMC will not receive more than 6 additional billets to supplement its current level of approximately 150 cost performance monitors, DCMC is reengineering its approach to CS² implementation along the lines of statistical process control measurement techniques. This would represent a management-by-exception approach to CS² reviews. This may be a less costly and burdensome approach that could have potential for reducing the resources and infrastructure associated with traditional CS² implementation practices, especially when coupled with the streamlined industry earned value criteria discussed below. How well such an approach meets the basic needs of all the communities is yet unknown.

DCMC has begun to work with contractors to change the surveillance focus from the traditional oversight role to one based on what DOD refers to as insight—the ability to identify problems through process-based indicators such as the number of retroactive changes to cost accounts or the frequency of replanning actions. Each major defense contractor will work with DCMC to identify appropriate process and control objectives. Ultimately, once each contractor designates its unique control limits, DCMC staff would only be required to review those processes that are out of tolerance. In addition, DCMC plans to work with industry to encourage firms to assume responsibility for their management systems and processes.

Industry Standard Developed by Contractors

In August 1996, five industry associations published an industry standard, Industry Standard Guidelines for Earned Value Management Systems (EVMS), as a replacement to the current government CS² criteria. DOD formally recognized the guidelines in the industry standard in December 1996. The Director, Defense Procurement, has issued an interim rule to enable contractors to begin using the EVMS without having to wait for the formal regulatory change process. The long-range plan is for the standard to be approved by the American National Standards Institute[4]

[4]The American National Standards Institute serves as the administrator and coordinator of the U.S. private sector voluntary standardization system. It promotes and facilitates voluntary consensus standards.

and the International Standards Organization[5]. This would formally move earned value into common usage worldwide. In addition, Australia, Canada, and the United States have signed a memorandum of understanding concerning common cost and schedule management for their acquisitions.

The EVMS contains 32 criteria, which are similar to the DOD criteria in principle. For example, both sets of criteria are divided into five broad categories: organization; planning, scheduling, and budgeting; accounting; analysis and management reports; and revisions and data maintenance. Each category describes the internal controls that should exist to facilitate proper program management. They also contain provisions for breaking out work into discrete work packages, documenting changes to the performance baseline, and measuring cost, schedule, and technical accomplishment. The industry standard gives the contractor the flexibility to revise the system as needed to reflect work consistent with internal management structures and to track costs at a higher organizational level than the level typically tracked in DOD programs. (See app. I for a more detailed comparison.)

Despite their general similarities, the two criteria have significant differences that could affect government oversight. One such difference is that the government may no longer have the same review and approval authority over contractor management systems that it had in the past. DOD does not accept the self-certification provisions of the EVMS standard. Instead, it would like to find some middle ground between self-certification and traditional government certification. DOD's goal is to encourage contractors to conduct self-evaluations with the government acting as an observer. However, DOD's recently revised implementation guidance does not preclude a government review, when warranted, or a third-party certification arrangement. The third-party certification concept represents the standard industry practice for quality assurance systems. Although not required by the International Standards Organization—the industry organization responsible for the quality assurance standards—it is a generally accepted practice to get a third-party certification in order to meet its quality standards. This approach may mitigate some potential risks of the self-evaluation process and prove to be less burdensome than DOD's traditional review and certification process.

[5]The International Standards Organization is a nongovernmental entity whose mission is to promote the development of standardization and related activities in the world. Its focus is to facilitate the international exchange of goods and services and to develop intellectual, scientific, technological, and economic cooperation.

Other differences associated with the EVMS standard include the absence of specific requirements for access to data by the customer (in this case, DOD) for oversight purposes and the fact that program baseline and contractor management systems may be changed as needed, with notification of, but not approval by, the customer. Use of this standard on future procurements should give the contractor greater ability to manage and improve its processes. However, it could impede government oversight unless DOD is able to obtain accurate and timely information on contract performance. Therefore, acquisition program managers will have to ensure that access to data and reporting provisions are included on individual contracts. Likewise, the increased flexibility to revise the program baseline may make it more difficult to track divergences from original program goals.

Technology Advances Can Improve Data Timeliness and Quality

Current technology offers improvements that could enhance the timeliness of the CS^2 data as well as integrate cost and schedule performance with technical performance. For several years, DOD has recognized the need to improve data timeliness and has focused on developing EDI capability. We found that several program managers have experimented with getting direct access via personal computers to contractor databases. This permits them to see at the same time the same data the contractor uses to manage the program. The government program managers who have used these systems are very pleased with the quality and timeliness of the information. We spoke to managers in several program offices who believe that having direct access to the same data the contractor uses to manage is critical.

For example, the Joint Stand-Off Weapon system program has a direct access system that was custom built for the program. It contains cost, schedule, manufacturing, test, and engineering/technical information using a variety of displays. The system uses commercially available software and the data is updated twice a month. Cost data is available only to the program manager and two others to protect the contractor's proprietary rate information. Similarly, the Sea-Launched Attack Missile Extended Range program is using a direct access system that enables its technical staff to pull up weekly status data by component or subsystem. Each integrated product team also reports progress each week. Information is displayed in terms of labor hours, not cost. Cost data is consolidated and presented at a high level. Improvements in the direct-access processes are being made to allow subcontractor data to be included and also to include such items as indirect charges to the contract and overhead.

These practices represent a departure from the traditional implementation of CS^2, but technically have always been permissible under the basic 35 criteria. Nonetheless, using the streamlined direct access process has not been universally accepted. Some DOD officials have expressed concerns about the potential for inaccurate data in these systems that a monthly cost performance report review and audit would pick up. In addition, the direct access may only provide detailed data on the prime contractor status, and summary level information on subcontractor status. Another concern is that the cost information may not include full overhead charges. To implement this approach, the government may need to install special high-speed transmission or "trunk lines" that could be expensive and prohibit small programs from using it. Because of these concerns, DOD has not endorsed this approach, but is focusing on EDI implementation.

Managers of these two programs believe that direct access systems are very beneficial and have found work-arounds for some of these concerns. According to the author of the EDI cost performance report data set, the ultimate goal is to standardize the data format in reports. The author believes that the optimal solution would be to standardize to a common data format so that DOD could reach into a contractor's database to access, download, and analyze information. This would allow a program office to monitor the progress of a contractor's performance, using the currently accepted reporting formats, on a near real-time basis. This standardization would also allow for the almost instantaneous analysis by the users of this information no matter what software or hardware the contractor or the government use. This capability would eliminate some of the concerns to unique direct access systems while still giving the program manager the flexibility to design a system that meets the needs of his particular program.

Another promising effort is a technical risk assessment process being developed and tested by the Navy's Program Executive Office for Air Anti-Submarine Warfare, Assault, and Special Mission Programs. This effort is intended to work in tandem with the CS^2 information to enable the manager to integrate technical progress with cost and schedule data. In an early test, it was able to highlight and quantify technical risks on one program much earlier than the CS^2 process did. The process requires that the critical technical performance and schedule drivers be identified at the start of the program. By developing specific risk curves and progress plans for each parameter, the program manager can obtain insights not just into work progress, but also technical success. This provides an early warning of technical problems, permitting the manager to mitigate cost and

schedule impacts. For example, in a retrospective analysis of an aircraft cockpit program, the software predicted problems more than a year before the CS² process did because the CS² process, as applied, emphasized cost and schedule integration without adequate regard for technical performance. This software is currently being tested by the Federal Aviation Administration and is scheduled to be used on the H-1 Helicopter Upgrade program.

Conclusions and Recommendations

DOD has taken major steps to create an organizational environment that can facilitate making needed changes to the CS² process. DCMC faces a number of challenges as it begins its stewardship of the process. These include implementing initiatives to improve its utility to program managers and to streamline certification and reporting requirements, determining how best to manage the certification review process, and deciding on a number of proposed improvements. To be successful, DCMC will need to understand the resource implications of these challenges.

Another challenge DCMC faces, perhaps more subtle than the above reforms, is to better balance the needs of the different communities that depend on earned value information. A common understanding of these basic needs will be instrumental to DCMC's ability to protect each user's basic needs from others' secondary desires. Specifically, as DCMC endeavors to make CS² more responsive to program managers, it will have to guard against basic oversight needs going unmet. We recommend that the Secretary of Defense (1) promulgate the basic needs of the organizations that depend on earned value information in some manner, such as in the implementing guidance for EVMS and (2) take steps to ensure that the "wants" of one organization do not encroach upon the basic needs of other organizations that depend on earned value information as the management of the CS² process transitions to DCMC and as DCMC makes decisions on reforms in the future.

In addition, several initiatives relevant to the CS² process are ongoing, including EDI, IBRS, direct access, technical risk assessment, self-certification, and the application of statistical process control techniques to the surveillance process. Some of these are being demonstrated in varying degrees on different programs, while others are still in the policy stage. It is important that DOD ensures that as these initiatives are tested on individual programs, data is captured in a disciplined enough manner to support decisions on what to implement and how. Such data will not only help get the most out of each initiative, but

will also make it easier to recognize possible interactions among initiatives.

Agency Comments

DOD generally concurred with our conclusions and recommendations. It agreed with the need to make sure that the "wants" of one organization do not outweigh the needs of another. It cited the establishment of two groups that will help ensure that the needs of all organizations that use earned value information are met. These are (1) the Integrated Program Management Initiative Executive Steering Group, which includes representatives from the Office of the Secretary of Defense, the services, DCMC, and other organizations; and (2) the Performance Management Advisory Council under DCMC, which will have service representatives from the earned value community and from the project management or acquisition communities. According to DOD, the Council will also participate in a contractor cost data reporting initiative, along with the cost-estimating community. DOD agreed that the relationships among the organizations as well as their information needs should be made clear in its EVMS guidance.

In the draft of this report, we recommended that DOD rebaseline the basic needs of the organizations that depend on earned value information. DOD believed that it did not need to formally rebaseline these needs because it had developed a good understanding of them in arriving at the significant reforms it is currently making to CS^2 and in identifying the earned value skills needed by business, cost-estimating, and financial management specialists. We agreed to delete the recommendation from the final report with the proviso that DOD would reassess its progress on earned value reform and on meeting the needs of the key organizations. Accordingly, DOD stated that the Integrated Program Management Initiative Executive Steering Group would assess such progress. DOD also stated that the group will coordinate all earned value management improvement efforts with other initiatives, such as electronic access and risk management.

Scope and Methodology

To develop information for this report, we contacted, interviewed, and obtained documents from officials of the Office of the Secretary of Defense and DCMC because of the policy-making responsibilities and reform initiatives occurring at these levels. In addition, we obtained information from officials at the Office of Management and Budget; the Federal Aviation Administration; the Office of the Secretary of Defense Cost Analysis Improvement Group; service headquarters; Army Materiel

Command; Navy Air Systems Command; Program Executive Office for Air Anti-Submarine Warfare, Assault, and Special Mission Programs; Air Force Materiel Command; Aeronautical Systems Center; and Defense Plant Representative Office personnel from General Electric, Lynn, Mass; Boeing, Seattle, Wash; Lockheed Martin, Sunnyvale, Ca; and McDonnell Douglas, St. Louis, Mo. We contacted all program managers responsible for Acquisition Category 1D programs in engineering and manufacturing development. We received responses from all but 1 of these 16 programs. We also contacted officials from the governments of Australia and Sweden to obtain information on their requirements for cost schedule control systems.

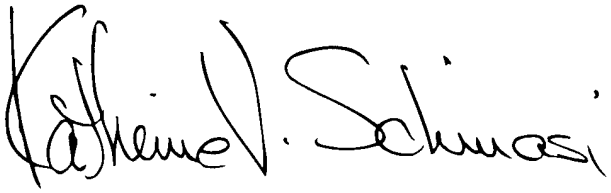
To obtain industry's perspective on policy issues and implementation practices, we contacted representatives from the following industry or professional associations: National Security Industrial Association, Aerospace Industries Association, Performance Management Association, and Project Management Institute. We also discussed these issues with representatives from the following commercial and military contractors: Boeing, General Electric, Lockheed Martin, Loral, Magnavox, McDonnell Douglas, Motorola, Northrop/Grumman, Raytheon, Supply Tech, Inc., Texas Instruments, Textron, and United Defense Limited Partnership.

To address historical information and obtain independent views on how current policy initiatives could affect future implementation practices, we contacted representatives from the Massachusetts Institute of Technology and Wright State University and the following consulting groups: Coopers & Lybrand LLP, KPMG Peat Marwick LLP, Humphreys & Associates, Fleming Management Consultancy, and Write Concepts. We also obtained historical information from the Management Systems Deputy, Air Force Assistant Secretary for Financial Management and Comptroller.

We performed our review from June 1996 to March 1997 in accordance with generally accepted government auditing standards.

We are sending copies of this report to other interested congressional committees; the Secretary of Defense; the Commander, DCMC; and the Director of the Office of Management and Budget. We will also make copies available to others upon request.

Please contact me at (202) 512-4383 if you or your staff have any questions concerning this report. The major contributors to this report were Paul Francis, Rae Ann Sapp, and Jeff Hunter.



Katherine V. Schinasi
Associate Director
Defense Acquisitions Issues

Comparison of DOD and Industry Criteria

DOD's Criteria	Industry's Criteria
Organization	Organization
1. Define all authorized work and related resources to meet the requirements of the contract, using the framework of the contract work breakdown structure.	Define the authorized work elements for the program. A work breakdown structure, tailored for effective internal management control, is commonly used in this process.
2. Identify the internal organizational elements and the major subcontractors responsible for accomplishing the authorized work.	Identify the program organizational structure, including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.
3. Provide for the integration of the contractor's planning, scheduling, budgeting, work authorization, and cost accumulation systems with each other, the contract work breakdown structure, and the organizational structure.	Provide for the integration of the company's planning, scheduling, budgeting, work authorization, and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.
4. Identify the managerial positions responsible for controlling overhead (indirect costs).	Identify the company organization or function responsible for controlling overhead (indirect costs).
5. Provide for integration of the contract work breakdown structure with the contractor's functional organizational structure in a manner that permits cost and schedule performance measurement for contract work breakdown structure and organizational elements.	Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.
Planning & budgeting	Planning, scheduling, & budgeting
6. Schedule the authorized work in a manner that describes the sequence of work and identifies the significant task interdependencies required to meet the development, production, and delivery requirements of the contract.	. . . . interdependencies required to meet the requirements of the program.
7. Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure output.	Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.

(continued)

DOD's Criteria	Industry's Criteria
8. Establish and maintain a time-phased budget baseline at the cost account level against which contract performance can be measured. Initial budgets established for this purpose will be based on the negotiated target cost. Any other amount used for performance measurement purposes must be formally recognized by both the contractor and the government.	Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost including estimates for authorized but undefinitized work. On government contracts, if an over target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.
9. Establish budgets for all authorized work with separate identification of cost elements (labor, material, etc.).	Establish budgets for authorized work, with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.
10. To the extent the authorized work can be identified in discrete, short-span work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire cost account cannot be subdivided into detailed work packages, identify the far-term effort in larger planning packages for budget and scheduling purposes.	To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far-term effort in larger planning packages for budget and scheduling purposes.
11. Provide that the sum of all work package budgets plus planning packages within a cost account equals the cost account budget.	Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.
12. Identify relationships of budgets or standards in underlying work authorization systems to budgets for work packages.	No comparable provision.
13. Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which cannot be identified as discrete or as apportioned effort will be classed as level of effort.	. . . . Only that effort which is unmeasurable or for which measurement is impractical may be classified as level of effort.

(continued)

DOD's Criteria	Industry's Criteria
14. Establish overhead budgets for the total costs of each significant organizational component whose expenses will become indirect costs. Reflect in the contract budgets, at the appropriate level, the amounts in overhead pools that will be allocated to the contract as indirect costs.	Establish overhead budgets for each significant organizational component of the company for expenses that will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.
15. Identify management reserves and undistributed budget.	Same.
16. Provide that the contract target cost plus the estimated cost of authorized but unpriced work is reconciled with the sum of all internal contract budgets and management reserves.	Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.
Accounting	Accounting considerations
17. Record direct costs on an applied or other acceptable basis in a formal system that is controlled by the general books of account.	Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.
18. Summarize direct costs from cost accounts into the work breakdown structure without allocation of a single cost account to two or more work breakdown structure elements.	When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.
19. Summarize direct costs from the cost accounts into the contractor's functional organizational elements without allocation of a single cost account to two or more organizational elements.	Summarize direct costs from the control accounts into the contractor's organizational elements without allocation of a single control account to two or more organizational elements.
20. Record all indirect costs that will be allocated to the contract.	Same.
21. Identify the basis for allocating the cost of apportioned effort.	No comparable provision.
22. Identify unit costs, equivalent unit costs, or lot costs, as applicable.	. . . or lot costs when needed.
23. The contractor's material accounting system will provide for: a. Accurate cost accumulation and assignment of costs to cost accounts in a manner consistent with the budgets using recognized, acceptable costing techniques.	For earned value management systems, the material accounting system will provide for: Accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques.
b. Determination of price variances by comparing planned versus actual commitments.	No comparable provision.

(continued)

DOD's Criteria	Industry's Criteria
c. Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of actual receipt of material.	. . . but no earlier than the time of progress payments or actual receipt of material.
d. Determination of cost variances attributable to the excess usage of material.	No comparable provision.
e. Determination of unit or lot costs when applicable.	No comparable provision.
f. Full accountability for all material purchased for the contract, including the residual inventory.	Full accountability for all material purchased for the program, including the residual inventory.
Analysis	Analysis and management reports
24. Identify at the cost account level on a monthly basis using data from, or reconcilable with, the accounting system: a. Budgeted cost of work scheduled and budgeted cost of work performed. b. Budgeted cost of work performed and applied (actual where appropriate) direct costs for the same work. c. Variances resulting from the above comparisons classified in terms of labor, material, or other appropriate elements together with the reasons for significant variances.	At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system: 1. Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance. 2. Comparison of the amount of the budget earned with the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.
25. Identify on a monthly basis, in detail needed by management for effective control, budgeted indirect costs, actual indirect costs, and variances along with the reasons.	Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.
26. Summarize the data elements and associated variances listed in [24] and [25] above, through the contractor organization and work breakdown structure to the reporting level specified in the contract.	Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the contract.
27. Identify significant differences on a monthly basis between planned and actual schedule accomplishment and the reasons.	Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.
28. Identify managerial actions taken as a result of criteria items [24] through [27] above.	Implement managerial actions taken as the result of earned value information.

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DOD's Criteria	Industry's Criteria
29. Based on performance to date, on commitment values for material, and on estimates of future conditions, develop revised estimates of cost at completion for work breakdown structure elements identified in the contract and compare these with the contract budget base and the latest statement of funds requirements reported to the government.	Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements, including statements of funding requirements.
Revisions and access to data	Revisions and data maintenance
30. Incorporate contractual changes in a timely manner, recording the effects of such changes in budgets and schedules. In the directed effort before negotiation of a change, base such revisions on the amount estimated and budgeted to the functional organization.	Incorporate authorized changes in a timely manner, recording the effects of such changes in budgets and schedules. In the directed effort prior to negotiation of a change, base such revisions on the amount estimated and budgeted to the program organizations.
31. Reconcile original budgets for those elements of the work breakdown structure identified as priced line items in the contract, and for those elements at the lowest level of the DOD program work breakdown structure, with current performance measurement budgets in terms of (a) changes to the authorized work and (b) internal replanning in the detail needed by management for effective control.	Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.
32. Prohibit retroactive changes to records pertaining to work performed that will change previously reported amounts for direct costs, indirect costs, or budgets, except for correction of errors and routine accounting adjustments.	Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments should be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.
33. Prevent revisions to the contract budget base except for government-directed changes to contractual effort.	Prevent revisions to the program budget except for authorized changes.
34. Document internally, changes to the performance measurement baseline and notify the procuring activity expeditiously through prescribed procedures.	Document changes to the performance measurement baseline.
35. Provide the contracting officer and the contracting officer's authorized representatives with access to the information and supporting documents necessary to demonstrate compliance with the cost/schedule control system criteria.	No comparable provision.

Comments From the Department of Defense

OFFICE OF THE UNDER SECRETARY OF DEFENSE

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ACQUISITION AND TECHNOLOGY

02 APR 1997

Mr. Louis J. Rodrigues
Director, Defense Acquisition Issues
National Security and International
Affairs Division
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Rodrigues:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "MAJOR ACQUISITIONS: Significant Changes Underway in DoD's Earned Value Management System," dated March 11, 1997 (GAO Code 707153/OSD Case 1309).

The Department generally concurs with the conclusions and recommendations in the subject GAO draft report, and is pleased that GAO recognizes the significant positive changes being made in DoD business management practices. Specific comments are in the enclosure. Additional technical comments were provided directly to the GAO staff for their consideration. Some of the annotations to the draft report warrant the following additional comments to provide clarifying background information and information on new developments.

The DoD Cost/Schedule Control Systems Criteria (C/SCSC) and their replacement, Earned Value Management Systems (EVMS) Criteria, describe the attributes of acceptable contractor management control systems, but do not require any external reporting. Customer requirements for contract cost and schedule performance reporting must be determined on a case-by-case basis, reflecting each program manager's unique needs for data produced by the contractor's internal systems. Levels of detail, timeliness, and delivery methods for the reports thus are all subject to negotiation. As GAO points out, the program manager's needs in those areas often were not met when C/SCSC was viewed primarily as a financial reporting requirement.

Reporting has two interrelated dimensions: Internal use of data for periodic management review by the contractor, and external reporting to the DoD customer. The analysis criteria require that data reported to customers

are summarized directly from the contractor's internal data. Advances in electronic access have reduced the data time lag significantly by providing near-real-time information. As such techniques continue to evolve, Integrated Product Teams will ensure that the needs of all earned value data users are considered.

The Defense Contract Management Command (DCMC) appreciates the challenges involved in changing the way it does business, and is taking steps to ensure it will meet the demands posed by its stewardship of the EVMS change process. The most important element of the new approach to EVMS is contractor acceptance of responsibility for their own management control systems. As this shift in ownership evolves, DCMC will replace its traditional C/SCSC oversight with an insightful process-oriented approach to be developed in cooperation with each contractor.

DCMC is establishing a Performance Management Advisory Council (PMAC) to redefine DoD Component relationships and to improve DCMC support to DoD program managers. The PMAC also will exchange representatives with the Contractor Cost Data Reporting reengineering initiative begun recently by the DoD Cost Analysis Improvement Group. All earned value management improvement efforts will be coordinated by the Integrated Program Management Initiative Executive Steering Group (ESG) with other appropriate initiatives involving, for example, electronic access to data and risk management. The ESG will assess continually the degree to which the PMAC and program integrated product teams are meeting the objectives of earned value management reform.

See p. 21.

The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Daniel P. Czelusniak
Director, Acquisition
Program Integration

Enclosure

GAO DRAFT REPORT - DATED MARCH 11, 1997
(GAO CODE 707153) OSD CASE 1309

"MAJOR ACQUISITIONS: SIGNIFICANT CHANGES UNDERWAY IN DOD'S EARNED VALUE MANAGEMENT SYSTEM"

DEPARTMENT OF DEFENSE COMMENTS

- **RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense (1) baseline the basic needs of the organizations that depend on earned value information and promulgate this baseline in some manner, such as in the implementing guidance for the Earned Value Management System (EVMS), and (2) take steps to ensure that the "wants" of one organization do not encroach upon the basic needs of other organizations that depend on earned value information as the management of the CS^2 process transitions to the Defense Contract Management Command (DCMC) and as DCMC makes decisions on reforms in the future. (pp. 26-27/GAO Draft Report)

- **DOD RESPONSE TO THE DRAFT REPORT:** Generally concur.

The Department of Defense (DoD) employs an Integrated Product Team (IPT) management philosophy to ensure that the needs of all organizations are met in Defense acquisition. In the earned value management area, top-level integration is achieved through the Integrated Program Management Initiative Executive Steering Group (ESG), representing the acquisition organizations of the Office of the Secretary of Defense, the Services, DCMC, the Ballistic Missile Defense Organization, the National Reconnaissance Office, and the National Security Agency. DCMC is establishing a Performance Management Advisory Council (PMAC). The PMAC will fulfill the coordinating role previously performed by the Performance Measurement Joint Executive Group. One PMAC representative from each DoD Component will be drawn from the earned value management community to ensure continuity in the transition from C/SCSC. Each DoD Component will also provide a representative from acquisition or project management to help identify and implement improvements in support to program managers. Integration with the cost estimating community is achieved through participation on the DoD Contractor Cost Data Reporting (CCDR) reengineering initiative.

See p. 21.

As part of its acquisition reform initiatives, DoD has identified the earned value skills required by various categories of business, cost estimating, and financial management specialists. Many of the people involved in this activity also are represented on the PMAC and the CCDR reengineering group. Each discipline understands its own needs for earned value information and has a voice in the change process. Accordingly, DoD does not believe there is any further value to be gained from a formal baselining process. However, DoD agrees that its EVMS implementing guidance should make clear the relationships among the organizations as well as their information needs. The PMAC will make this a high priority under the leadership of the ESG, with completion by July 31, 1997.

See p. 21.

With respect to the second part of the recommendation, DoD concurs. The ESG will ensure that its representatives on the PMAC effectively follow the IPT management approach. In addition, the PMAC and the CCDR reengineering group will continue their interdisciplinary cooperation.

Enclosure