Chapter 7 – Earned Value Management

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References

(a) Federal Acquisition Regulations (FAR)

(b) OMB Circular A-11 Part 7

(c) Defense Federal Acquisition Regulations Supplement

(d) Electronic Industries Alliance (EIA) Standard 748, Earned Value Management Systems

(e) NAVSEAINST 7000.4G, Earned Value Management

(f) DoD Earned Value Management Implementation Guide (EVMIG)

(g) USD Memorandum of 23 April 2007, DCMA Earned Value Management (EVM) Roles and Responsibilities

(h) DCMA Concept of Operations for Earned Value Management Systems

(i) ASN(RDA) memo of 9 Apr 2007, Center of Excellence for Earned Value Management (CEVM)

(j) NAVSEANOTE 5400, “Cost Engineering and Technical Authority Policy” of 13 Apr 04

(k) National Defense Industrial Association (NDIA) Earned Value Management Intent Guide

(l) MIL-STD-881C, Work Breakdown Structures for Defense Material Items

(m) DoD Instruction 5000.02, Operation of the Defense Acquisition System

(n) DoD Directive 5105.36, Defense Contract Audit Agency

(o) DCMA EVMS Standard Surveillance Operating Manual (SSOM)

Chapter 7 – Earned Value Management

7.1 Introduction

This chapter provides information regarding the principles of Earned Value Management (EVM), DoD's requirements for EVM, the criteria used to approve a contractor's Earned Value Management System (EVMS), and the responsibilities of SUPSHIPs and other activities regarding Earned Value Management. For personnel unfamiliar with EVMS, Appendix 7-A provides a basic introduction to the topic. Also note that a Glossary is provided to define commonly used EVMS terminology.

Earned Value Management (EVM) has proven its value over many years. Effective implementation and application of Earned Value Management Systems by contractors ensures that they possess and use an adequate management system that integrates cost, schedule, and technical performance. This approach provides better overall planning and control discipline on Government contracts. A properly employed, compliant EVMS provides the Program Manager (PM) and SUPSHIP with valid cost, schedule, and technical progress information needed for effective decision-making, risk-management, and contract administration.

7.2 Policy and Directives

In accordance with reference (a), FAR 34.2, and as required by reference (b), OMB Circular A-11 Part 7, an Earned Value Management System is required for major acquisitions for development. DFARS Subpart 234.201, reference (c), imposes the following EVMS requirements for DoD contracts:

a. For cost or incentive contracts and subcontracts valued at $20 million or more, the EVMS shall comply with the guidelines in Electronic Industries Alliance (EIA) Standard 748, reference (d).

b. For cost or incentive contracts and subcontracts valued at $50 million or more, the contractor shall have an EVMS that has been determined by the cognizant Federal agency to be in compliance with the guidelines in ANSI/EIA-748.

c. For cost or incentive contracts subcontracts valued at less than $20 million:

   (1) The application of EVM is optional and is a risk-based decision.

   (2) A decision to apply earned value management shall be documented in the contract file.

   (3) A cost-benefit analysis is conducted following the procedures at DFARS PGI 234.201 (1) (iii).

d. For firm-fixed price contracts and subcontracts of any dollar value:

   (1) The application of EVM is discouraged.

   (2) Procedures at DFARS PGI 234.201 (1) (iv) should be followed for obtaining a waiver before applying EVM.

Note: EVM is not required on contracts, subcontracts, intra-government work agreements, and other agreements less than 12 months in duration, including options.

Reference (e), NAVSEAINST 7000.4G – Earned Value Management, establishes NAVSEA policies, procedures, and responsibilities for the implementation of Earned Value Management in NAVSEA procurements. Reference (f), the DoD Earned Value Management Implementation Guide (EVMIG), provides uniform procedures which have been approved by DCMA and coordinated with the Services.

7.3 Roles and Responsibilities

The responsibility for EVM in DoD is shared by five organizations:

- DoD EVM Executive Agent (DCMA)
- Component EVMS Focal Point
- Procuring Activity
- SUPSHIP/Contract Management Office
- Contract Auditor

The following sections discuss the general responsibilities associated with each of these activities. Section 7.7 provides a more detailed list of those responsibilities associated with EVMS surveillance.

7.3.1 DoD Executive Agent

Reference (g), USD Memorandum of 23 April 2007, directs the formal designation of the Defense Contract Management Agency (DCMA) as the EVMS Executive Agent for the Department of Defense. The Executive Agent is responsible for ensuring the integrity and effectiveness in application of processes related to earned value management. Additionally, in accordance with DFARS 242.302 (S-71), DCMA is responsible for reviewing earned value management system (EVMS) plans and for verifying initial and continuing contractor compliance with DoD EVMS criteria (see Appendix 7-B).

7.3.1.1 EVM Center

DCMA has established the EVM Center to enhance the level of EVM support the Agency provides to its DoD and non-DoD customers. The EVM Center's role is to oversee and advise DCMA and DoD management on the status of EVM implementation and sustainment. Additionally, the Center facilitates maximum use of EVM by industry and the Government. Reference (h), the DCMA Concept of Operations for Earned Value Management Systems, lists twenty responsibilities of the EVM Center, including:

- Responsibility to execute and oversee the roles and responsibilities of DoD Executive Agent for EVMS in conformance with DoD EVMS policy, as delegated.

- Responsibility for the development, control, and implementation of the DoD Earned Value Management Implementation Guide (EVMIG).

- Responsibility for the interpretation of DoD EVMS Criteria, including issues on guideline applications and system review requirements. Those differences which cannot be resolved between interested parties within the government and the contractor are to be appealed to the EVM Center for resolution.

- Exercising authority to the Administrative Contracting Officer (ACO) to execute the Advance Agreement or issue the Letter of Acceptance that recognizes acceptance of the contractor EVMS with the final determination of adequacy coming from the EVM Center. The EVM Center may ultimately recommend withdrawal of the Government's previously recognized compliant EVMS to the ACO.

7.3.2 Component EVMS Focal Point

Each Service establishes a focal point to serve as a point of contact for coordination and exchange of information on earned value management. The EVMS focal point is responsible for effective policy implementation within their service, including ensuring consistency with DoD policy. In accordance with reference (i), ASN(RDA) memo of 9 Apr 2007, the Navy's EVM focal point is the Navy Center for Earned Value Management (CEVM) within the ASN(RDA) office.

7.3.3 Procuring Activity

The DoD Earned Value Management Implementation Guide (EVMIG), section 2.1.3.4, defines the Procuring Activity as being composed of the Program Management Office (PMO), the contracting organization, and the integrated component activities that support the PMO. For shipbuilding programs, this will most often consist of the PEO/PM and NAVSEAs 02 and 05. The Program Manager and the PMO have the responsibility to help ensure that all solicitations and contracts contain the correct EVMS and Integrated Master Schedule (IMS) requirements, tailored as appropriate for the specific nature of the program in accordance with DoD policy. The PM and PMO also have the responsibility to conduct the Integrated Baseline Review (IBR), perform integrated performance analysis, use this performance data to proactively manage the program, and accurately report performance to decision makers.

NAVSEAINST 7000.4G assigns the following responsibilities to NAVSEA codes and the Program Manager:

Deputy Commander for Ship Design Integration & Engineering (NAVSEA 05)

1. Through NAVSEA 05C, act as the Command focal point for EVM and all related matters. NAVSEA 05C is the warranted Technical Authority for Cost Engineering. The Single Process Owner (SPO) for Cost Engineering Policies and Processes is the Subject Matter Expert (SME) for the implementation and utilization of Earned Value Management.

2. Designate NAVSEA 05C Team Leaders to support respective PMs in the life cycle of EVM and assist in the conduct of Integrated Baseline Reviews (IBR) for ACAT I, ACAT II, and

other selected programs. Additionally, NAVSEA 05C will assist the Contract Administration Office (CAO) in the determination of contractor systems compliance with ANSI/EIA-748.

3. Through NAVSEA 05C, assist the PM in developing an Estimate at Completion (EAC) required for the Defense Acquisition Executive Summary (DAES) report..

Deputy Commander for Contracts (NAVSEA 02)

1. For contracts requiring EVM, and with PM and NAVSEA 05C coordination, invoke EVMS in solicitations and contracts.

2. When appropriate, use past performance of contractors based on EV data as an evaluation criteria for all competitively negotiated acquisitions.

Program Manager

1. Include appropriate EVM requirements in acquisition plans and Statements of Work for RFPs/contracts that require EVM, tailoring such requirements as necessary for the management of the program.

2. Negotiate a Memorandum of Agreement (MOA) with SUPSHIP to define management system surveillance duties and analysis on shipbuilding contracts containing EVM requirements.

3. Include NAVSEA 05C and USD (AT&L) Central Repository (as appropriate) on the DD Form 1423, Contract Data Requirements List (CDRL), for distribution of Contract Performance Reports (CPRs), Integrated Master Schedule (IMS), and Contract Funds Status Reports (C/FSRs).

4. Make full use of CPRs, IMS, C/FSRs and other reports in managing and evaluating contractor performance.

5. Include NAVSEA 05C on Contract Award Reviews/Contract Implementation Reviews

6. Include the designated NAVSEA 05C Team Leader in the planning and performance of an IBR.

7. Conduct an IBR within 6 months of contract award (see paragraph 7.5.2.5.3).

8. Encourage EVM and analysis training for all Program staff and participation at program reviews.

9. Maintain adequate documentation regarding implementation of EVM (e.g. results of IBRs and MOAs). The program office shall be the normal repository for such information.

7.3.4 SUPSHIP Contract Management Office

The Contract Management Office (CMO), also known as the Contract Administration Office (CAO), is the office that is assigned to administer contractual activities at a specific contractor facility. Although EVMIG section 2.1.3.5 states that the cognizant CMO is a part of DCMA, SUPSHIPs perform the role of the CMO for contracts awarded major shipbuilders under their cognizance (see Federal Directory of CAS Components). In accordance with NAVSEAINST 7000.4G and the EVMIG, SUPSHIPs are responsible for:

a. Negotiating and executing an Advance Agreement or Letter of Acceptance between the Government and the contractor specifying that the contractor will maintain and use the contractor's accepted EVMS as an integral process on the current as well as future contracts.

b. When necessary, and following the procedures of EVMIG section 2.3.5, withdrawing contractor EVMS validation.

c. Establishing a Joint Surveillance Team comprised of the contractor, SUPSHIP, Program Office, and DCAA personnel, and developing a formal surveillance plan for each program having an EVM requirement in accordance with the MOA requirements of the Program Manager. Active surveillance will commence upon contract award and shall be ongoing during negotiations with the PM regarding MOA development and/or update.

d. Monitoring compliance with the contractor's accepted EVMS. SUPSHIP will report any contractor failure to comply with major items of that EVMS to NAVSEA 05C, the cognizant PM, and DCMA.

e. Providing members and administrative support to on-site review teams.

f. Maintaining adequate documentation of certification, monitoring, and surveillance activities of the contractor. The SUPSHIP shall be the normal repository for such information.

7.3.5 Defense Contract Audit Agency (DCAA)

The Defense Contract Audit Agency (DCAA) is responsible for conducting audit reviews of the contractor's accounting system policies, procedures, and activities. The contract auditor assigned by DCAA participates in surveillance and earned value management reviews.

7.4 EVMS Guidelines Concept

EVMS guidelines were established on the premise that the Government cannot impose a single EVMS for all contractors due to variations in organizations, products, and working relationships. The guidelines establish a framework within which an adequate integrated cost, schedule, and technical management system fits. The EVMS guidelines are not prescriptive, but simply describe the desired outcomes of integrated performance management.

The EVMS guidelines have been published as the ANSI/EIA Standard 748, Earned Value Management Systems. DoD adopted ANSI/EIA-748 in August 1998 for application to major defense

acquisition programs. Industry periodically reviews the standard, and Revision B was published in 2007 without change to the basic guidelines. If the ANSI/EIA-748 standard is changed or updated, DoD will review and determine if the document still meets the Government's requirements.

7.4.1 EVMS Guidelines

EVMS guidelines are intended to be objective and applicable to large, risky, cost-based Government programs. The purpose of the guidelines is to provide the contractor and the Government with accurate data to monitor execution of a program and to:

- Preclude the imposition of specific cost and schedule management control systems by providing uniform evaluation guidelines to ensure contractor cost and schedule management control systems are adequate.
- Provide an adequate basis for responsible decision-making by both contractor management and DoD component personnel by requiring that contractors' internal management control systems produce data that:
    - Indicate work progress
    - Properly relate cost, schedule, and technical accomplishment
    - Are valid, timely, and able to be audited
    - Provide DoD component managers with information at a practical level of summarization
- Encourage DoD contractors to adopt management control systems and procedures that are most effective in meeting requirements and controlling contract performance.
- Provide a baseline requirement against which industry standards, both national and international, may be evaluated for authorization by the Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD (AT&L)) as substitutes for DoD EVMS guidelines.

7.4.1.1 Key Attributes of EVMS

EVM systems that comply with the ANSI/EIA Standard 748 facilitate:

- thorough planning of all program work scope to completion
- integration of work scope, schedule, and cost objectives into a single baseline plan
- baseline establishment at the beginning of the contract
- baseline control throughout the contract
- objective measurement of work accomplishment at levels where the work is being performed

- summarized reporting for management decision-making
- early identification of problems and the corrective actions needed to mitigate the resulting risk
- development of estimates of final technical, schedule, and contract costs
- visibility into subcontractor performance

7.4.1.2 ANSI/EIA Standard 748 Guidelines

Standard 748 is composed of 32 EVMS guidelines grouped in the following five major categories:

- organization
- planning, scheduling, and budgeting
- accounting considerations
- analysis and management reports
- revisions and data maintenance

Appendix 7-B is an excerpt of the EVMS System Surveillance Section of the DCMA Guidebook that provides a complete list of the 32 EVMS criteria organized within these five categories. Appendix I of the EVMIG, provides a detailed discussion and evaluation guide for these criteria. It is organized by management process, however, not by the five categories used in the ANSI/EIA-748 standard. Appendix 7-C of this chapter provides a Guidelines-Process Matrix that shows how the 32 guidelines are organized within the five categories of the standard and how they relate to the nine management processes used for EVMS evaluation. Reference (k), the National Defense Industrial Association (NDIA) Earned Value Management Intent Guide, provides more in-depth information regarding the meaning and intent of these 32 guidelines and is intended for industry use in the implementation of an Earned Value Management System.

7.5 EVM Overview

Earned Value Management (EVM) is a program management tool that integrates technical, cost, and schedule parameters to measure contract performance against a baseline plan. EVM provides SUPSHIP and the Program Manager (PM) with contractor cost, schedule, and performance information which:

- relates time-phased budgets to specific contract tasks
- objectively measures work progress
- properly relates cost, schedule, and technical accomplishments

- allows for informed decision-making and corrective action
- is valid, timely, and able to be audited
- allows for statistical estimation of future costs
- supplies managers with status information at the appropriate level
- is derived from the same management systems used by the contractor to manage the contract

7.5.1 Basic EVM Description

The basic requirements for effective implementation of an EVMS include:

1. Defining and organizing all work necessary to complete the project. This typically includes determining the scope of work required by the contract and organizing it into a Work Breakdown Structure (WBS).
2. Planning the work elements of the WBS to determine the time and estimated costs required to perform the work.
3. Developing a project network that integrates the scope of work, schedule, and cost objectives into a time-phased baseline plan that spans the duration of the project.
4. Defining "earning rules" for measuring the accomplishment of the WBS work elements. A variety of different earning rules may be applied within the same EVMS based on the nature of the work.
5. Periodically determining the project's earned value by applying the earning rules to each work element and summing the earned value of all work.
6. Comparing the earned value against the baseline plan to determine cost and schedule variances.
7. Analyzing significant variances to determine their cause, to forecast impact, and to determine appropriate corrective action.

Refer to Appendix 7-C for a depiction of an EVMS chart and the associated EVMS terminology.

7.5.2 Components and Processes of an Earned Value Management System

Implementation of EVMS for large-scale projects, such as the construction of Navy surface ships and submarines, requires considerable contractor effort and rigorous application of EVMS guidelines and processes if it is to provide accurate information concerning contract performance. The following sections describe the components and processes commonly found in an EVMS supporting major DoD programs.

7.5.2.1 Statement of Work (SOW)

The SOW for the program should reflect all work to be performed. The SOW communicates the work scope requirements for a program and should define the requirements to the fullest extent practicable. It is a basic element of control used in the processes of work assignment and establishment of program schedules and budgets.

7.5.2.2 Work Breakdown Structure (WBS)

The WBS is a direct representation of the work scope defined in the program SOW. It is an essential element of an Earned Value Management System used to provide the structure for identifying and categorizing the work to be performed. It is a hierarchal breakdown of the material, services, and operations that must be obtained or completed, by both government and commercial activities, in order to achieve the objectives of an acquisition program. It provides the framework for program and technical planning, cost estimating, resource allocation, performance measurement, technical assessment, status reporting, and EVMS data collection and reporting.

A preliminary top-level WBS is developed by the Program Manager and systems engineering staff early in the planning phase of acquisition programs utilizing reference (l), MIL-STD-881C – Work Breakdown Structures for Defense Material Items. The Program WBS is included as part of the solicitation and used by the successful contractor to develop a more detailed Contract Work Breakdown Structure (CWBS), when required by Data Item MGMT-81334D, which includes all product elements (hardware, software, data, or services) for which the contractor is responsible. The same WBS must be used on both the Contract Performance Report and the Cost and Software Data Reports.

7.5.2.3 Contractor Program Organization

It is important for the organization to be defined at the onset of the program so that work assignments are identified and responsibilities are clear. A company will organize as required for the optimal management of its business. This includes decisions such as the use of work teams or functional organizations and staffing by direct (project-oriented) or matrix management. This process includes identification and coordination of subcontracted work as well as internal efforts. A program organization is dynamic and may change as the program evolves.

The Organizational Breakdown Structure (OBS) reflects the way the program is organized. To assign work responsibility to appropriate organizational elements, any WBS and organizational structure must be interrelated with each other; that is, organizational responsibility must be established for identified units of work. The assignment of lower level work segments to responsible lower level managers provides a key control point for management purposes and cost collection. This is called the control account (CA). A CA thus represents a defined work scope (with the associated charge number or numbers) given to a single organizational unit (and single manager or team leader) for work performance. EVMS guidelines (See section 7.4.1 and Appendix 7-B) require that a control account be assigned to a single Control Account Manager (CAM) or team leader with responsibility for managing that account.

When effort is to be subcontracted out, the applicable subcontractor is identified and related to, or integrated with, the appropriate WBS element(s) and/or organization charged with acquiring the subcontracted item.

7.5.2.4 Program Schedule

The program schedule is the time-oriented plan for accomplishment of work scope requirements on a program. Schedule planning and control, along with work scope definition, are necessary prerequisites for basic program management and effective cost control. The scheduling process begins during original program definition and overall schedule plans are typically established during the pre-planning for a program.

For DoD acquisition programs, program scheduling takes the form of the Integrated Master Plan (IMP) and the Integrated Master Schedule (IMS). The IMP and IMS provide a systematic approach to program planning, scheduling, and execution. The primary purpose of the IMP and its supporting detailed schedule, the IMS, is their use by the Government and contractor team as day-to-day tools for planning, executing, and tracking program technical, schedule, and cost status.

The IMP is an event-based plan consisting of a hierarchy of program events, with each event being supported by specific accomplishments, and each accomplishment associated with specific criteria to be satisfied for its completion. The IMP is normally part of the contract and thus contractually binding. The IMP is a narrative explaining the overall management of the program.

The IMS is an integrated, networked schedule containing all the detailed discrete work packages and lower level tasks or activities necessary to support the events, accomplishments, and criteria of the IMP (if applicable). The events, accomplishments, and criteria are duplicated in the IMS. Detailed tasks are added to depict the steps required to satisfy the criterion. The IMS is directly traceable to the IMP and includes all the elements associated with production, modification, and delivery of the end product. It must also be traceable to the Contract Work Breakdown Structure (CWBS), the contract Statement of Work (SOW), and the EVMS. Durations are entered for each discrete work package and lower level tasks, along with predecessor and successor relationships, as well as any constraints that control the start or finish of each work package or lower level task. The result is a fully networked schedule that supports critical path analysis.

During contract execution, the IMP and IMS provide a framework for insight into the contractor's performance. When properly integrated with EVMS, the IMP and IMS should enable the Government and contractor to:

- identify and assess actual progress versus planned progress
- monitor the program critical path and help develop workarounds to problem areas
- assess program maturity
- assess the status of risk management activities based on the inclusion of the program risk mitigation activities in the IMP and IMS

- assess the progress on selected Key Performance Parameters (KPPs) and Technical Performance Measures (TPMs)
- provide an objective, quantitative basis for the contractor's performance assessment rating and award fee
- help develop and support "what-if" scenarios and to identify and assess candidate problem workarounds
- provide better insight into potential follow-on efforts that were not part of the original contract award, for example, the contractor should be able to more clearly define the activities, new interfaces, and other clarifying information necessary for a potential program increment or contract option

Refer to the Integrated Master Plan and Integrated Master Schedule Preparation Guide for more detailed information on the IMP and IMS.

7.5.2.5 Budget Allocation and Resource Planning

Before work can proceed, scope and budget must be authorized to the responsible organizations. The contractor's PM is given an internal authorization to proceed with contract work. Budgets and work scope then are divided among the program's organizations via formal work authorizations that communicate work assignments. All authorized work must be associated with a corresponding budget. This provides a documented trail of work authorization from the program office that clearly assigns program work requirements to the responsible organizations.

The process of work authorization, the approvals necessary, and the form will vary based on individual company policies and procedures. Work authorizations do not need to duplicate the SOW nor WBS dictionary, and can refer to that document for work scope definition. Work authorizations should describe the work to be performed in as much detail as needed for the CAM to understand the work to be accomplished. The company will decide on the flow of the work authorizations and the approvals that are needed. The authorizations may be communicated electronically or on paper. Work authorizations must be issued, before work is due to begin, for improved control and advance planning.

7.5.2.5.1 Establishing Control Accounts (CA) and Control Account Budgets

All CAs must contain a budget, schedule, and scope of work and should realistically represent the manner in which work is assigned and budgeted to organizational units. A resource plan must be developed for every Control Account and Summary Level Planning Package (SLPP - see section below). The resource plan is the time-phased budget that is developed in accordance with assigned work scope and schedule requirements.

Each CA is allocated a budget that reflects the resources necessary to complete the assigned effort. Budgets established at the CA level must be planned by element of cost and may be stated either in dollars, hours, or other measurable units. When units other than dollars are used, the company must determine the appropriate point of responsibility in their control system for rate application for

financial analysis and reporting. In all cases, it is necessary to use rates that will provide a valid Performance Measurement Baseline (PMB). When there are significant changes in the anticipated labor, overhead, or other rates, internal re-planning of remaining portions of the PMB is usually necessary.

The rates used in determining budgets will also be used for computation of earned value data. In general, the budget process should provide for:

- direct budgets allocated to organizations performing the planned work
- indirect budgets allocated to specific organizations having responsibility and authority for controlling indirect costs
- identification of any Management Reserve (MR) or Undistributed Budget (UB)

7.5.2.5.2 Performance Measurement Baseline (PMB)

The assignment of budgets to scheduled segments of work produces a plan against which actual performance can be measured. This is called the Performance Measurement Baseline. The PMB is a time-phased summation of:

- all Control Accounts (CA)
- Summary Level Planning Packages (SLPP)
- applicable indirect budgets
- any Undistributed Budget (UB)

Control Accounts may include both Work Packages (WP) and Planning Packages (PP). A Work Package is simply a task, activity, or grouping of work that has been planned and budgeted. A Planning Package is a budget holding account within a Control Account for future work for which it is not yet practicable to plan the work at the work package level.

Indirect costs (or overhead) consist of those costs for common or joint objectives that are not readily subject to treatment as direct costs. Indirect budgets are the budgeted indirect (or overhead) costs associated with Control Accounts, SLPP, and Undistributed budgets.

Summary Level Planning Packages are employed when it is impractical to plan authorized work in Control Accounts. A SLPP may be used to establish a high level holding account for a budget that is identified to some work scope, but which is not yet allocated to a Control Account. Budget and work should be identified to higher WBS or organizational levels for subdivision into Control Accounts at the earliest opportunity, and certainly before the work actually begins. Because a SLPP is associated with specific work scope, it should not be confused with a Management Reserve (MR) or Undistributed Budget (UB).

It should be noted that PMB includes only the budgeted amount associated with specific scope. For this reason, Management Reserve (MR) is not included in the PMB because it is an amount withheld

from the total budget for management control purposes and is not designated for the accomplishment of specific work. Undistributed Budget (UB) is included because it is a temporary holding account for specific work scope that has not yet been planned in detail at the control account or SLPP level.

An effective PMB possesses the following attributes:

- accurately represents all authorized work, and only authorized work, on the contract
- includes a realistic network schedule baseline
- includes a realistic time phased distribution of budget/resources to the baseline schedule

In addition to these attributes, an effective PMB requires a consistent commitment from both the contractor and the Government to enforce proper baseline change procedures and periodic review of the remaining baseline to ensure that it remains executable.

7.5.2.5.3 Integrated Baseline Review (IBR)

The Integrated Baseline Review (IBR) is a joint assessment led by the PM and supported by SUPSHIP and the contractor to verify the realism and accuracy of the PMB. This involves verifying the technical content of the baseline and assessing the realism and accuracy of the related resources. The IBR is a tool that should be used as necessary throughout the life of the contract. Key benefits of the IBR are:

- joint understanding of program risks
- management insight into the planning assumptions and the resource constraints of the baseline
- comparison of expectations so that any differences can be addressed early in the planning phase
- correction of baseline planning errors and omissions
- in-depth understanding of developing variances and improved early warning of significant variances
- targeting of resources to address challenges and mitigate risks
- mutual commitment by the joint team to manage to the baseline
- more executable programs

7.5.2.5.3.1 IBR Policy and Guidance

Reference (m), DoDI 5000.02, Operation of the Defense Acquisition System, implements 48 CFR Part 242 and 252 which require the PM and technical staff to conduct an IBR on any contract

requiring EVM compliance. Occasions for the Government to require integrated baseline reviews include:

- as early as practicable, and no later than 180 days after contract award
- after the exercise of significant contract options
- with the incorporation of major modifications or as otherwise agreed upon

IBRs are also performed at the discretion of the PM or when major events occur within the life of a program. These events may be a significant shift in the content and/or time-phasing of the PMB. An IBR should also be conducted whenever an Over Target Baseline (OTB) or Over Target Schedule (OTS) is implemented.

Refer to the EVMIG for more detailed information regarding the IBR. Additional guidance is also contained in a guide prepared by a joint OSD/NDIA team, The Program Manager's Guide to the Integrated Baseline Review Process. While this is not a detailed how-to guide, it does describe the key attributes of the IBR and establishes a framework for improving consistency of the IBR across DoD.

7.5.2.6 Accounting Considerations

An EVMS itself is not an accounting system. It does, however, rely on actual cost data from the contractor's accounting system for accurate reporting of program costs and measurement of contract performance. The establishment of work orders and other aspects of the accounting process must be coordinated with the establishment of Control Accounts and other aspects of the budgeting process so that direct comparison and analysis can be performed.

The accounting system must be capable of accounting for all resource expenditures on an "applied" basis (i.e., on an "as-used" or "as-consumed" basis). This requirement is fairly straightforward in the categories of direct labor (where time cards or other time measurement devices are used) or other direct charges (where services are typically charged on a per-unit basis, such as per man-hour of direct effort).

Acceptable costing techniques should be used to fully account for all material purchased for the program. To ensure effective performance measurement of material takes place, the contractor's accounting system should accurately accumulate material costs to the appropriate Control Account. Where actual costs are not available in a timely manner, estimated costs should be applied and adjustments made when actual costs are available.

7.5.2.7 Earned Value Methodologies

There are a number of basic earned value methodologies applicable to discrete work package efforts (efforts with definable scope and objectives that can be scheduled and on which progress can be objectively measured). Three basic methodologies are:

- valued milestones

- standard hours
- management assessments (only when these objective methods are not feasible)

There are many variations and combinations of these techniques. Also, quantitative formulae may be used to compute earned value for cases such as work in progress or inventory materials. These formulae, such as the PERT method for material, can cause data distortions (e.g., Negative BCWS) if not properly maintained. While this method may be appropriate for small value consumables, it is not an acceptable method for performance measurement of high value material that can be treated as discrete material items.

The valued milestone method involves the assignment of budget to specific work objectives (schedule milestones). That value is earned as the milestones are completed. It is important for the milestones to be natural and meaningful points of accomplishment.

The use of standard hours methodology (“equivalent units” is a similar process) is common in manufacturing accounts. Budget is time-phased in relation to the standard hour plan and should reflect the actual physical accomplishment of tasks within the work package. Earned value is accrued in proportion to the standard hour status as earned standards are sold/credited in the shops.

Management assessment may be used to determine the percentage of work completed for a task or group of tasks only when an objective method to determine the percentage is not feasible. Earned value is then calculated by applying that percentage to the total budget for the work. Management assessment may include the use of metrics for work measurement. Durations for these work packages should be kept short to minimize any distortions caused by their subjective nature.

The objective earned value methods (valued milestones or standard hours) are always preferred, but each method has its own merits and a company should use the most objective methods that best suit its management needs.

For short duration Work Packages (i.e., those of two months duration or less), other earned value methods are acceptable, such as percent complete, 0/100, and 50/50. In the 0/100 technique, 100% of the budget may be reported as earned when the Work Package is closed. In the 50/50 technique, 50% of the budget is earned when the Work Package is started and the remaining 50% is earned when the WP is closed.

7.5.2.7.1.1 Planning and Control of Level-of-Effort Activities

Level-of-Effort (LOE) is work scope of a general or supportive nature for which performance cannot be measured or is impractical to measure. Resource requirements are represented by a time-phased budget scheduled in accordance with the time the support will likely be needed. For discrete WPs, accomplishment can be measured based on the completed pieces of work, but LOE is "measured"' through the passage of time. Since the earned value for LOE is equal to the budget for the same time period, the performance data provided is simply a comparison of budgeted to actual cost.

LOE activity should be separately identified from discrete work packaged effort to avoid distorting that which is measurable. Some general guidelines for LOE are:

- The amount of LOE activity will vary among performing organizations, but it should be held to the lowest practical level.
- LOE budgets should be separately substantiated and planned as direct labor, material/subcontract, or other direct costs. LOE activity should be budgeted on a time-phased basis for control and reporting purposes.
- When LOE and discrete effort are mixed within the same CA, the CAM must ensure visibility into the performance of the discrete effort.
- LOE may be re-planned if the work will not occur when planned or will slip past planned (not contract) milestones. This avoids artificial cost variances.

7.5.2.8 Performance Measurement and Analysis

Earned value is a direct measurement of the quantity of work accomplished. Earned value is a value-added metric that is computed on the basis of the resources consumed compared to the accomplished work scope.

Earned value analysis evaluates program performance and facilitates problem identification for more effective management action. It also permits segregating schedule and cost problems for early and improved visibility of program performance. Management actions will typically involve lower level analysis of problems and implementation of corrective actions to restore or improve contract performance. Continued EV analysis permits analysis of these corrective actions to assess their effectiveness.

See Appendix 7-D for a graphical representation of EVMS terms and performance measurements.

7.5.2.8.1 Significant Variances

Reasonable selection criteria should be established to ensure proper analysis of significant problems and not cause an excessive burden on the CAM and mid-level managers. The selection criteria should ensure all significant variances are analyzed and any external reporting requirements are supported. Although the frequency and nature of external reports is dictated by the contract, the frequency and style of reports for *internal* management is a company option. Unless otherwise specified in contracts, standardized reports and formats may be used for customer reports on subcontracts or Government contracts per mutual agreement, provided that CPR formats 1-4 are submitted in the ANSI X12 Transaction Set 839 or equivalent.

7.5.2.8.1.1 Schedule Variance (SV)

Comparing the earned budget (the value of work accomplished) during a given period of time to the value of work scheduled (planned budget) during the same period of time provides a valuable indication of schedule status in terms of dollars' worth of work accomplished. It represents the

quantity, i.e., the value, of the work that is ahead of or behind schedule. In essence, it is an "accomplishment" variance.

Although the SV metric provides early insight into detail schedule conditions and overall schedule performance, it should not be the sole source for determining the contractor's performance to schedule. Schedule variance does not clearly indicate whether scheduled milestones are being met since some work may have been performed out of sequence or ahead of schedule. Neither does SV indicate whether a completed activity is a critical event or if delays in an activity's completion will affect the completion date of the contract. A formal time-phased scheduling system, therefore, must be used to provide the means of determining the status of specific activities, milestones, and critical events. Additionally, other techniques, such as critical path analysis, may be better indicators of long-range time projections. However, a trend analysis of the changes in the SV metric can provide a valid and useful indication of current performance and near term projections, as well as early identification of incipient cost problems.

7.5.2.8.1.2 Cost Variance (CV)

Cost performance is determined by comparing the actual cost of the work accomplished to the earned value for the same work scope, i.e., the budgeted cost of the work accomplished. The resultant metric is the Cost Variance (CV). The CV is a true measure of cost performance as it compares the actual cost incurred to the value of work accomplished. It thus eliminates the distortions inherent in a simple comparison of actual costs to a total budget.

Analysis of this difference reveals the factors contributing to the variances. These may include:

- poor initial estimate for the task
- technical difficulties that require additional resources
- cost of labor or materials different than planned
- differences between planned and actual rates
- incorrect or inadequate selection of the earned value methodology
- personnel efficiency different than planned (rate analysis and analysis of prime costs, i.e., labor hours, may be segregated to isolate rate changes and efficiency factors)

Variance At Completions (VAC) represents the amount of expected overrun (negative VAC) or under-run for the contract. It can be determined by taking the difference between the Budget At Completion (BAC) and the Estimate At Completion (EAC) [VAC = BAC – EAC]. Because it can be calculated at the Control Account level, in addition to the total contract level, it can serve as a useful metric for focusing management attention on the sources of cost performance problems. While this performance analysis involves examination of what has occurred, the focus should be on the control of current actions and assessment of future plans. The assessment of future plans should project when the remedial actions will be completed and its impact on schedule and EAC.

7.5.2.9 Estimates at Completion (EAC)

An Estimate at Completion (EAC) is determined by estimating the Cost to Complete (CTC) the contract and adding it to total costs incurred to date. A comprehensive EAC should be periodically developed at the CA level using all available information to arrive at the best possible estimate. This is done by:

- evaluating the efficiency achieved by performing organizations for completed work and comparing it to remaining budgets
- establishing a schedule forecast that reflects the expected timeframe for completing the remaining work
- considering all remaining risk areas on the program versus cost avoidance possibilities
- ensuring the most current direct and indirect rate structure is used to value the projected resources
- applying this analysis to future efforts to derive the most accurate estimate

The EAC should be the most likely estimate of the total costs for all authorized program efforts and should be time-phased in accordance with the expected completion dates on program schedules. The basis for the EAC and the reasons for changes from the last estimate should be identified.

Comparisons of this estimate to budgets for the associated effort must be made frequently enough for management to ensure program performance and resource availability will not be adversely impacted. Monthly maintenance of the CA level EAC by the CAM ensures that the EAC continuously reflects a valid projection of program costs.

The schedule for establishment and maintenance of EAC data depends on program management needs and overall company or corporate financial review requirements. A company should conduct periodic (at least annual) comprehensive EAC reassessments. Alternatively, a company should establish an on-going process of EAC review and maintenance. In either case, significant EAC changes should be incorporated whenever they are identified.

7.5.2.10 Revisions and Data Maintenance

Changes in major programs are inevitable. This discussion addresses the controlled process whereby programs incorporate formal changes, conduct internal re-planning, and adjust past, present, and future information to accommodate changes. The keys are timeliness and control. The budget will change as contract changes are authorized and incorporated or as internal re-planning actions are taken. Rate changes and economic price adjustments may also be made as appropriate. Changes to budgets in the current or past accounting periods should only be made for the correction of errors or the effects of contract negotiation.

Revisions to program plans must be carefully controlled. The PMB should reflect the current program management plan for accomplishment of program objectives. It must be up-to-date and

should include all authorized changes. It is equally important that unauthorized changes are not introduced. Incorporating changes should not precipitate the elimination of existing cost and schedule variances (sometimes referred to as “single point adjustments”). If the maintenance of baseline plans is compromised, the information on management reports will be degraded.

7.5.2.10.1.1 Customer-Directed Changes

Customer-directed changes to the program can impact virtually all aspects of the internal planning and control system, such as organization structures, work authorizations, budgets, schedules, and EACs. The incorporation of authorized changes should be made in a timely manner and strictly controlled. This will ensure the PMB can be accurately maintained.

7.5.2.10.1.2 Traceability to Previous Budgets

The original budget established for the program should constitute a traceable basis against which program growth can be measured. The starting point or base on which these original budgets are built is the program target cost. This value increases or decreases only as a result of authorized changes. For definitized changes, the program target cost changes by the negotiated amount. For authorized work that has not been negotiated, the program target cost increases by the amount of cost estimated for that effort. Where a specified Not-to-Exceed (NTE) amount has been established, the program target cost will only increase by this amount unless both parties mutually agree to a different amount for performance measurement purposes. After negotiations, the program target cost is adjusted to reflect the negotiation results. Adequate records of all changes should be maintained to provide the basis for reconciliation back to the original budgets assigned during the baselining process.

7.5.2.10.1.3 Control Internal Changes to the PMB

Future plans may significantly vary from the original baseline, and the PM may choose to realign scope, schedule, or budget. Some examples of when it may be appropriate to do internal re-planning (i.e., within the program target cost or approved TAB) include:

- changes resulting from a Preliminary Design Review (PDR) or a Critical Design Review (CDR) that modify future requirements
- a major shift in the resource profile to accomplish the remaining effort
- funding restrictions or modifications that affect future resource availability
- rate changes that are significant enough to warrant re-planning

Internal re-planning is intended for in-scope changes to future budgets. The objective of internal re-planning is to reflect a revised program plan. Changes to near-term effort (scheduled to start in the next accounting period) must be minimized.

Changes in the funding projections for a program may affect both the schedule and the cost for a program. The movement of budget to meet a new funding profile requires a reassessment of the

schedule for the associated work. There may also be cost impact due to rate differences in the affected time periods.

7.5.2.10.1.4 Over Target Baselines (OTBs) and Over Target Schedules (OTS)

During contract execution, the contractor may conclude that the budget and schedule for performing the remaining work is decidedly insufficient and no longer represents a realistic plan. At this point the contractor should prepare and submit a request to implement an OTB and/or OTS.

An Over Target Baseline (OTB) is a PMB that has been formally reprogrammed to include additional performance management budget in excess of the contract's negotiated cost. An OTB increases the performance budget without modifying the work scope or other constraints of the contract.

An Over Target Schedule (OTS) condition is created when the contractor re-plans the schedule to a schedule that exceeds the contract milestones or delivery dates. This new schedule also becomes the basis for the performance budgets. While it is possible to have an OTS without a corresponding increase in cost, normally an OTS is accompanied by increased costs and therefore by an OTB.

Implementing an OTB or OTS is a major management decision for the contractor and requires Government approval at the start of the process. Consequently, the PM should fully understand the concepts and processes. The PM should consider the factors discussed below when considering whether an OTB or OTS is appropriate for the contract and when evaluating the contractor's request.

See section 2.5.2.5 of the EVMIG for additional information.

7.6 Contract Requirements

7.6.1 Evaluation

Evaluation of the contractor proposed EVMS and the nine EVM management processes is normally undertaken as part of the proposal evaluation process. This evaluation is an assessment to determine if the contractor's system meets the ANSI/EIA-748 guidelines.

7.6.2 Contract Award

The contract award phase is primarily a PCO/Program Office function that would include SUPSHIPs upon request. When EVM is required in a contract, the following sections of the contract will include EVM related requirements:

- Section C - Includes EVM in Statement of Work
- Section I - Includes EVMS FAR and DFAR Clauses
- Section J - Includes EVMS Data Items
    - Contract Performance Report (CPR)

  - Integrated Master Schedule (IMS)
  - Contract Work Breakdown Structure

- Section L - Includes EVMS descriptions in proposal
- Section M - Includes EVMS as an evaluation factor

The Statement of Work (SOW) tasks, FAR/DFAR contract clauses, and the CDRL items require the contractor to:

- use and maintain an EVMS that meets the ANSI/EIA-748 guidelines
- notify the Government of any EVMS changes
- provide the Government with access to EVMS pertinent records and data
- require EVMS on selected subcontractors
- support a Government – Contractor Integrated Baseline Review (IBR)

7.6.3 Post-Contract Award

Although the EVMIG describes a variety of post-contract award activities, including functions associated with contract administration, delivery, and contract close-out. The five primary EVM elements associated with post-contract award are:

- Contract Award Review/Contract Implementation Review
- EVM System Validation
- EVM System Surveillance
- Integrated Baseline Review
- Program Management Reviews

7.6.3.1 EVMS System Validation

DoD policy requires EVMS validation for all DoD EVM contracts of $50 million or greater. For shipbuilding contracts, this responsibility would typically fall on DCMA. EVM validation determines that the EVMS:

- meets the intent of the ANSI/EIA-748 guidelines
- accomplishes the nine EVM management processes
- is being used appropriately on the contract

7.6.3.2 Integrated Baseline Review (IBR)

The IBR is a joint risk assessment of the EVM Performance Measurement Baseline (PMB) conducted by the Government PM, SUPSHIP, and the contractor. DoD acquisition policy and NAVSEAINST 7000.4G require PMs to conduct IBRs on EVM contracts:

- within six months of contract award
- upon exercise of significant contract options
- upon incorporation of major modifications
- as otherwise agreed

7.7 EVM Surveillance and Maintenance

EVM surveillance is the process of assessing a contractor's EVMS to ensure that it continues to comply with ANSI/EIA -748 guidelines, and that the contractor is following its own EVMS processes and procedures. Surveillance ensures that the contractor's EVMS:

- provides timely and reliable cost, schedule, and technical performance measurement information summarized directly from the contractor's internal management system
- complies with the guidelines
- provides timely indications of actual or potential problems
- maintains baseline integrity
- provides information that depicts actual conditions and trends
- provides comprehensive variance analysis at the appropriate levels including proposed corrective action in regard to cost, schedule, technical, and other problem areas
- discusses actions taken to mitigate risk and manage cost and schedule performance

7.7.1 Surveillance Policy

In accordance with the EVMIG, surveillance of management control systems is required for all contracts that require EVMS compliance with ANSI/EIA-748. EVMS surveillance begins at contract award and extends throughout the life of the contract. Government surveillance, including access to all pertinent contractor records and data, is implemented in the contract through the inclusion of DFARS clause 252.242-7004.

7.7.2 Surveillance Responsibilities

A number of organizations are involved in the surveillance of the contractor's EVMS. These include the contractor, the PMO, the Earned Value Management Support Staff (EVMSS), SUPSHIP (CMO), and the DCAA Field Audit Office (DCAA FAO).

7.7.2.1 Contractor

The contractor is ultimately responsible for maintaining an EVMS that is compliant with ANSI/EIA-748.

7.7.2.2 Program Management Office

The responsibilities of the PMO include:

- Negotiating and updating the MOA with SUPSHIP (see paragraph below)
- Keeping SUPSHIP informed of actions and matters which could affect EVMS surveillance
- Assisting in the resolution of problems cited in surveillance reports by providing required support to SUPSHIP
- Reviewing, evaluating, and analyzing usefulness of the surveillance reports, and where necessary, stating required changes to the reporting practices
- Obtaining assistance from the cognizant SUPSHIP or DCMA EVM Center in resolving surveillance issues

The MOA is a negotiated agreement between the PMO and the SUPSHIP that identifies the key individuals, specific responsibilities, priorities, reporting requirements, and working relationships. The MOA may also be negotiated by SUPSHIPs and DCMA CMOs where multiple prime contractors or major subcontractors are involved. The MOA describes the activities necessary to achieve and maintain effective program surveillance. It should be executed at the beginning of the contract and reviewed on an annual basis. A sample MOA is included as Appendix 7-E and can be found as Appendix A of the EVMIG.

7.7.2.3 Earned Value Management Support Staff (EVMSS)

The Earned Value Management Support Staff (EVMSS) is the Procuring Activity's subject matter experts responsible for providing technical support to PMOs. For shipbuilding contracts procured by NAVSEA, the EVMSS is NAVSEA 05C, the Cost Engineering and Industrial Analysis Division, with assistance from SUPSHIP personnel for programs under their cognizance. The EVMSS can assist the PMO with input to the MOA, provide guidance in analyzing CPRs, support IBRs, and support risk assessments. The EVMSS may also participate as members of an Integrated Surveillance Team.

7.7.2.4 SUPSHIP

As the CMO, SUPSHIP is responsible for overall EVMS in accordance with DFARS 242.302(S-71) and is responsible for system surveillance activities to ensure the contractor's system continues to comply with the ANSI EVMS guidelines. In accordance with the EVMIG, EVM personnel within SUPSHIP having EVMS surveillance responsibilities are as follows (titles may vary among SUPSHIPs):

- The EVMS Specialist is assigned the overall responsibility for surveillance of the contractor's EVMS. This includes evaluation of contractor proposed changes to the system. The EVMS Specialist should be cognizant of the procuring activity EVMSS who can provide assistance in resolving surveillance issues.

- The Program Support Team (PST) members are assigned responsibility for accomplishing surveillance in their respective functional or organizational area.

- The Program Integrator (PI)/Support Program Integrator (SPI) serves as the SUPSHIP focal point on major program contracts (or designated major/critical subcontracts).

- The Administrative Contracting Officer (ACO) is designated as the agent of the Government responsible for assuring that the contractor complies with the contract. The ACO is a member of the PST.

See section 7.3.4 for additional SUPSHIP responsibilities concerning EVMS surveillance.

7.7.2.5 Production Surveillance

Production Surveillance is a function of contract administration used to determine/validate contractor physical progress, assess quality of workmanship, assess compliance with technical requirements, and identify any factors that may delay performance (see FAR 42.11). While the contractor is responsible for timely contract performance, the Government must maintain adequate surveillance of contractor performance to protect its interests. Production surveillance involves Government review and analysis of contractor performance plans, schedules, controls, and industrial processes, as well as the contractor's actual performance under them. The ACO is responsible for determining the extent of surveillance required. See section 5.5 of this manual (Project Management – Work Progressing) for more information.

7.7.2.6 DCAA Field Audit Office (FAO)

Reference (n), DoDD 5105.36, Defense Contract Audit Agency (DCAA), assigns DCAA to "perform all necessary contract audits for the Department of Defense and provide accounting and financial advisory service regarding contracts and subcontracts…as appropriate." These include providing advice to SUPSHIP on the acceptability of incurred costs and estimates of costs to be incurred. Additional responsibilities include verifying the adequacy of the contractor's accounting, financial management, and estimating systems and procedures. DCAA Field Audit Offices, in partnership with the SUPSHIP and the DoD Executive Agent for EVMS, has the following responsibilities:

- reviewing the contractor's accounting system for compliance with the EVMS and contract provisions including verification that there is consistency with related budgeting and work authorization systems

- determining the accuracy and reliability of the financial data contained in the contract cost reports prepared from the contractor's systems

- reporting any significant unresolved deficiencies in the contractor's EVMS

- coordinating the appropriate EVMS surveillance requirements into routine DCAA audit programs and procedures with the SUPSHIP and DCMA EVM Center

- advising the EVMS Specialist regarding DCAA surveys of contractor systems and other audits which may bear on EVMS acceptability or surveillance

7.7.3 The Surveillance Process

Surveillance should be based on recurring evaluation of internal management control practices and samples of internally and externally reported data to ensure the validity of the contractor's performance data provided to the Government. The surveillance process should focus on major system activities and problem identification to ensure the greatest return for resources expended. A risk based approach, as described in the DCMA Guidebook (EVMS System-Level Surveillance), should identify specific areas for increased focus and surveillance. See also the DCMA EVMS Standard Surveillance Operating Manual (SSOM), reference (o).

If deficiencies are discovered in the contractor's compliance with ANSI/EIA-748, the SUPSHIP should document the problem and then notify the contractor of the problem along with any corrective action required. The SUPSHIP follows up to ensure the deficiency is resolved in a timely manner. EVMS problems that cannot be resolved with the contractor are reported to the ACO for resolution.

SUPSHIP reviews the Contract Performance Report (CPR) and related EVM data on a recurring basis or as agreed in the MOA with the PM. SUPSHIP provides the PM with an independent and complete assessment of the accuracy and timeliness of CPR information as agreed to in the MOA. These reports specifically highlight issues that could affect contract milestones or areas of considerable cost, schedule, or technical risk.

7.7.4 Surveillance of Subcontractors and Other Prime Contractor Locations

Subcontracts and other locations or divisions of the prime contractor that fall under EVM requirements may require surveillance by another SUPSHIP or a DCMA CMO. The SUPSHIP having cognizance of the prime contract would then delegate surveillance responsibility to the responsible SUPSHIP or CMO. When a subcontractor is required to comply with the EVM criteria, the prime contractor is responsible for surveillance of the subcontractor; however, the government has the right to also conduct subcontractor surveillance through the EVM DFAR flow-down.

SUPSHIP EVMS surveillance is normally limited to evaluating the effectiveness of the prime contractor's management of the subcontractor. However, there may be occasions when the PM or a

prime contractor requests, through the ACO, that the Government perform limited or complete EVMS surveillance. Such support administration is not to be construed as a discharge of the prime contractor's contractual obligations and responsibilities in subcontract management. Such assistance should generally be provided only when:

- The prime contractor is unable to accomplish the required surveillance because it would jeopardize the subcontractor's competitive position or proprietary data is involved.
- A business relationship exists between the prime contractor and subcontractor not conducive to independence and objectivity, as in the case of a parent-subsidiary or when prime and subcontractor roles of the companies are frequently reversed.
- The subcontractor is sole source and the subcontract costs represent a substantial portion of the prime contract's costs.

7.7.5 Surveillance of Non-Validated Systems

Surveillance of non-validated EVM systems is conducted in the same manner as for validated systems, per the processes and responsibilities noted in the previous sections. The primary reason for performing surveillance on non-validated systems is to ensure that the contractor implements a system that is compliant with ANSI/EIA-748 and that the resulting data is valid. Surveillance of non-validated systems should not be expanded nor construed to imply Government validation. See EVMIG, section 2.3.8, for a discussion on handling deficiencies found during surveillance of non-validated systems.

7.7.6 EVM System Changes

The contractor is contractually obligated to maintain the company's EVMS in conformance with ANSI/EIA-748. Continuing innovations and improvement of the contractor's system are encouraged; however, such changes to the EVMS need to be approved by the DoD Executive Agent for EVMS, as described in the EVMIG, section 2.3.4, unless waived by the contracting officer in accordance with FAR 52.234-4 or other contract clause provisions.

7.7.7 Reviews for Cause (RFC)

After formal acceptance of a contractor's EVMS, no further system review is conducted unless there is a serious need determined by the Government. The decision to conduct a review may occur when conditions warrant, e.g., solving a major system application problem identified by the SUPSHIP or PM on a specific contract. The key element in the decision process is whether the output of the processes meets the intent of the guidelines and is usable for decision-making. SUPSHIP should consult DCMA EVM Center prior to initiating a Review for Cause. EVMIG section 2.3.5 provides additional information concerning RFCs.

7.7.8 Deficiencies in Validated EVM Systems

Deficiencies may be uncovered either in the EVM system processes or in the consistency and discipline of the validated processes. These deficiencies may be discovered during routine

surveillance or during analysis of performance data. SUPSHIP should notify and consult with the PCO and EVMSS (SEA05C) if major deficiencies are identified. EVMIG section 2.3.6 provides additional information regarding the process for correcting deficiencies and restoring compliance. This process is designed to provide the contractor an opportunity to correct deficiencies prior to formal withdrawal of the company's EVMS validation. Additionally, NAVSEA ltr Ser 04X13B/120 of 26 July 2001 requires a SUPSHIP to submit a "Bellringer" report in the case of "disapproval of, or intent to disapprove contractor administrative systems."

Appendix 7-A: Introduction to EVM

In its simplest form, development of an EVMS consists of four steps:

1. Define the work. This is typically done in a hierarchal arrangement called a work breakdown structure (WBS). The importance of this step is to ensure that the WBS is a comprehensive list of all the elements of work to be performed, that work be uniquely identified in only one work element, and that the level of detail in the WBS is appropriate for the size and complexity of the project.

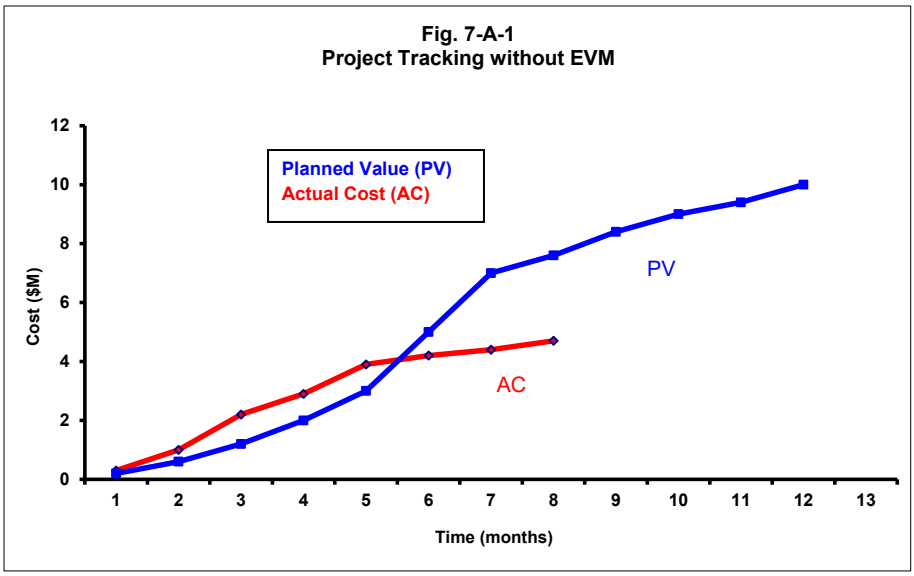
2. Assign a Planned Value (PV) to an appropriate level of work as defined in the WBS. For large projects, the summation of all work element PV's will total the project PV which is usually the total project budget. A time-phased plot of PV forms the performance baseline for measuring performance.

3. Define "earning rules" for the work elements. A variety of different earning rules may be applied within the same EVMS, or a single earning rule may be employed, such as the 50/50 rule, to all work elements. Using the 50/50 rule, 50% credit is earned when an element of work is started and the remaining 50% is earned upon completion.

4. At periodic intervals, sum the "earned value" of all work performed and measure this earned value against the baseline. From this earned value metric, cost and schedule variances can be determined and analyzed against the performance baseline. These basic variance measurements permit the identification of significant drivers, forecast future cost and schedule performance, and develop actions to correct project deficiencies.

<u>A Graphical Example of EVM</u>

To gain a basic understanding of EVM, it is useful to first consider a graphical example of project management performed without the benefit of EVM. Figure 7-A-1 depicts a project that has been planned in detail, including a time-phased spending plan shown as the blue Planned Value (PV) line. It also shows the cumulative costs incurred as the red Actual Cost (AC) line. With the data available, it appears the project was over budget through month 5, and under budget for months 6 through 8. In terms of budget alone that may be true, but what is missing from this chart is an indication of how much work has been performed. If the project was completed at month 8, then clearly the project is both under budget and ahead of schedule, but if the project was only 20% complete at month 8, then the project is almost certainly behind schedule and over budget. In order to know for sure, there needs to be a measure of how much work has been performed. This is the information provided by EVM.



Consider now the same project, this time including a measure of technical performance, i.e., the amount of work accomplished. Various methods may be used for calculating Earned Value depending on the nature and complexity of a project, but for the purposes of this example, we will assume it is calculated as the percentage of work elements completed times total budget for the entire project (Budget at Completion - BAC). Figure 7-2 shows the Earned Value curve along with the Planned Value curve from figure 7-1. This chart shows the schedule performance aspect of EVM. At 8 months into the project, the Earned Value of approximately $6M equates to the planned progress at approximately 6.5 months. This equates to a Schedule Variance based on time of roughly 6 weeks behind schedule. Similarly, Schedule Variance can also be expressed in a dollar value by comparing the difference between the Planned Value and the Earned Value at 8 months into the project. This shows that we planned to have almost $2M more work accomplished than has actually been completed.

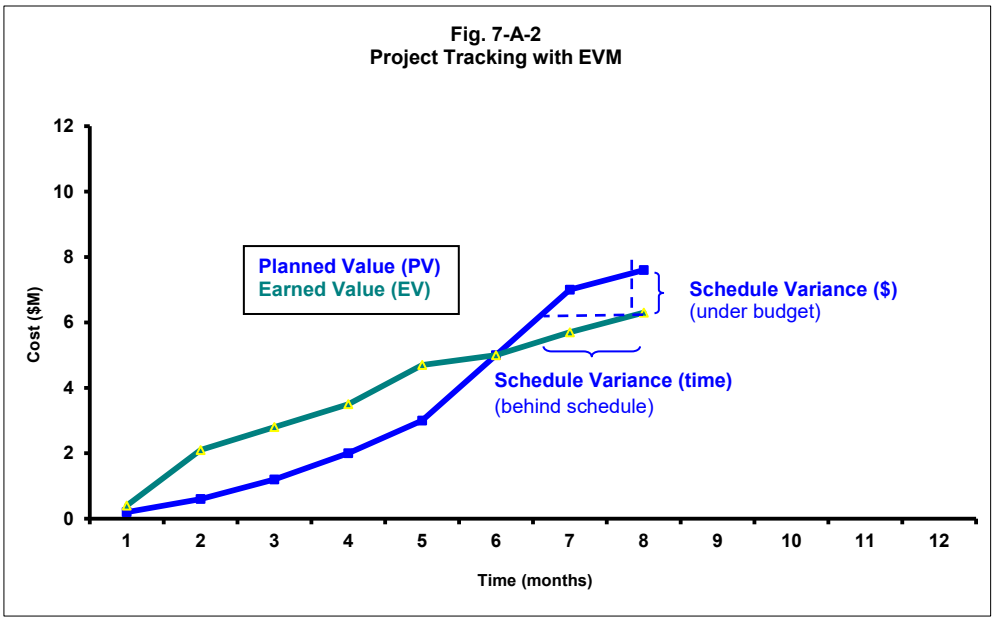
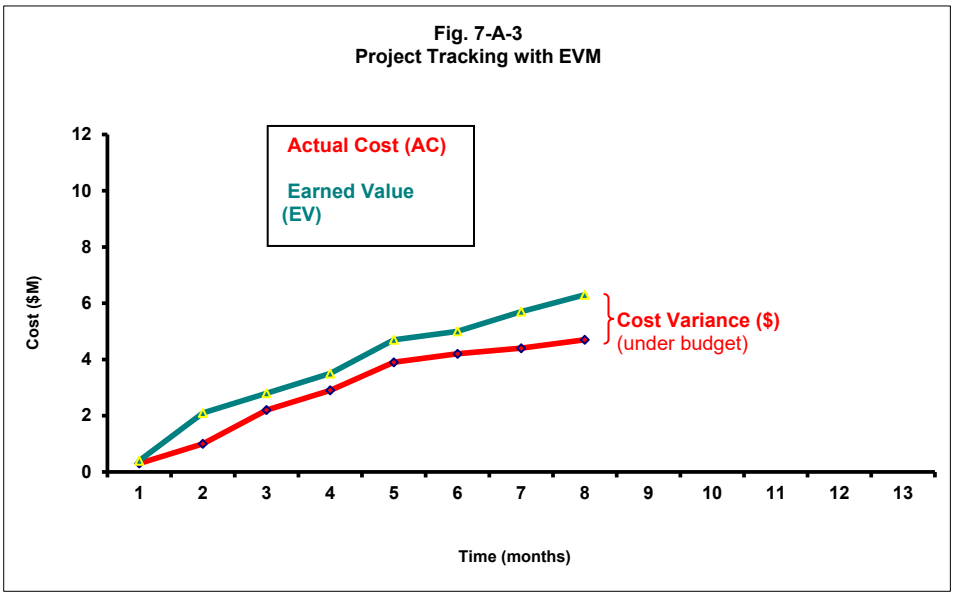
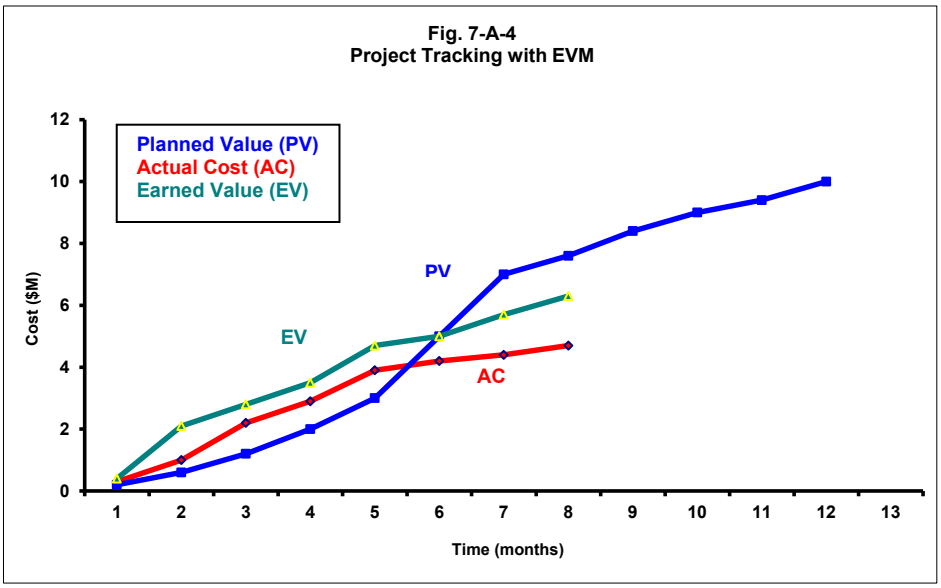


Figure 7-A-3 shows the same Earned Value curve along with the Actual Cost data from Figure 7-A-1. From this graph we can see that the Cost Variance can be determined by subtracting the Actual Cost from the Earned Value at 8 months into the project, or roughly $2M under budget for the amount of work completed.



Finally, figure 7-A-4 shows a typical EVM graph showing all 3 curves. The best way to interpret these 3-line charts is to focus on the Earned Value curve and compare it to the Planned Value curve to determine schedule performance and to the Actual Cost curve for Cost Performance. It can be seen from this illustration that a true understanding of cost and schedule performance is largely dependent on the ability to objectively measure technical performance (work progress).



Appendix 7-B provides a more detailed graphical example including a description of the terms and abbreviations commonly used in EVMS.

Appendix 7-B: EVMS Criteria

(From DCMA Guidebook, EVMS System Surveillance)

Organization

1. Define the authorized work element for the program. A work breakdown structure (WBS), tailored for effective internal management control, is commonly used in this process.

2. 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 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 company organization or function responsible for controlling overhead (indirect costs).

5. 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 and Budgeting

6. Schedule the authorized work in a manner which describes the sequence of work and identifies significant task 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 progress.

8. 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 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 it is practicable to identify the authorized work in discrete 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 long-term effort in larger planning packages for budget and scheduling purposes.

11. Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.

12. Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is immeasurable or for which measurement is impracticable may be classified as level of effort.

13. Establish overhead budgets for each significant organizational component of the company for expenses which 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.

14. Identify management reserves and undistributed budget.

15. Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.

Accounting Considerations

16. Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

17. 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.

18. 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.

19. Record all indirect costs which will be allocated to the contract.

20. Identify unit costs, equivalent unit costs, or lot costs when needed.

21. For EVMS, 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
- cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material
- full accountability of all material purchased for the program including residual inventory

Analysis and Management Reports

22. 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:

a) Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance.

b) Comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.

23. 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 the program management.

24. 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.

25. 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.

26. Implement managerial actions taken as the result of earned value information.

27. 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 Data Maintenance

28. 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.

29. Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal re-planning in the detail needed by management for effective control.

30. 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.

31. Prevent revisions to the program budget except for authorized changes.

32. Document changes to the performance measurement baseline.

Appendix 7-C: EVMS Guidelines-Process Matrix

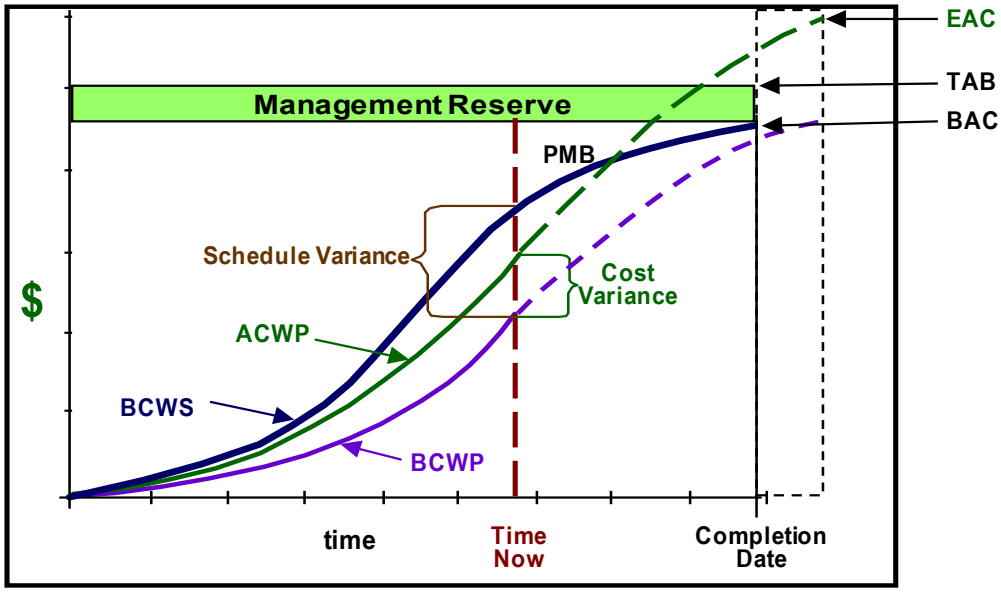
ANSI/EIA-748 Guidelines		PROCESS GROUPING								
		ORGANIZING	SCHEDULING	WORK/BUDGET AUTHORIZATION	ACCOUNTING	INDIRECT MANAGEMENT	MANAGERIAL ANALYSIS	CHANGE INCORPORATION	MATERIAL MANAGEMENT	SUBCONTRACT MANAGEMENT
ORGANIZATION										
2-1a	Define authorized work	X								
2-1b	Identify Program Organization Structure	X								
2-1c	Company integration of EVMS subsystems with WBS and OBS	X								
2-1d	Identify organization/function for overhead (DCAA)					X				
2-1e	Integrate WBS & OBS, create control accounts	X								
PLANNING, SCHEDULING & BUDGETING										
2-2a	Sequential scheduling of work		X							
2-2b	Identify interim measures of progress, i.e. milestones, products, etc.		X							
2-2c	Establish time-phased budget (DCAA)			X		X				
2-2d	Identify significant cost elements within authorized budgets			X						
2-2e	Identify discrete work packages			X						
2-2f	All work package budgets & planning packages sum to control acct			X						
2-2g	Identify and control LOE budgets			X						
2-2h	Establish overhead budgets by organization element (DCAA)					X				
2-2i	Identify management reserve and undistributed budget			X						
2-2j	Reconcile program target cost goal with sum of all internal budgets			X						
ACCOUNTING CONSIDERATIONS										
2-3a	Record direct costs from accounting system (DCAA)				X					
2-3b	Summarize direct costs into WBS without allocation (DCAA)				X					
2-3c	Summarize direct costs into OBS without allocation (DCAA)				X					
2-3d	Record indirect costs (DCAA)					X				
2-3e	Identify unit costs, equivalent units costs or lot costs (DCAA)				X					
2-3f	Accurate material cost accumulation by control accounts; EV measurement at right time; full accountability of material (DCAA)								X	
ANALYSIS AND MANAGEMENT REPORTS										
2-4a	Control account monthly summary, identification of CV and SV (DCAA)				X		X			
2-4b	Explain significant variances						X			
2-4c	Identify and explain indirect cost variances (DCAA)					X				
2-4d	Summarize data elements and variances thru WBS/OBS for mgmt						X			
2-4e	Implement management actions as result of EVM analysis						X			
2-4f	Revise EAC based on performance data; calculate VAC (DCAA)					X	X			
REVISIONS AND DATA MAINTENANCE										
2-5a	Incorporate authorized changes in timely manner							X		
2-5b	Reconcile budgets with prior budgets							X		
2-5c	Control retroactive changes (DCAA)				X			X		
2-5d	Prevent all but authorized budget changes							X		
2-5e	Document changes to PMB							X		

Legend

X Key Process

Cross Process Area

Appendix 7-D: Graphical Representation of EVMS Terms



Terminology

BCWS	Budgeted Cost of Work Scheduled accomplished	Value of work planned to be
BCWP	Budgeted Cost of Work Performed	Value of work accomplished
ACWP	Actual Cost of Work Performed	Cost of work accomplished
PMB	Performance Measurement Baseline	Contract time-phased budget plan
EAC	Estimate At Completion	Estimate of total cost for contract
TAB	Total Allocated Budget	Sum of all budgets for work on contract
BAC	Budget At Completion	Total budget for contract
TCPI	To Complete Performance Index	Efficiency needed from “time now” to achieve an EAC

Variances

Cost Variance	CV = BCWP – ACWP	CV% = CV / BCWP x 100%
Schedule Variance	SV = BCWP – BCWS	SV% = SV / BCWS x 100%
Variance at Completion	VAC = BAC – EAC	

Indices (>1 is favorable; <1 is unfavorable)

Cost Efficiency CPI = BCWP / ACWP

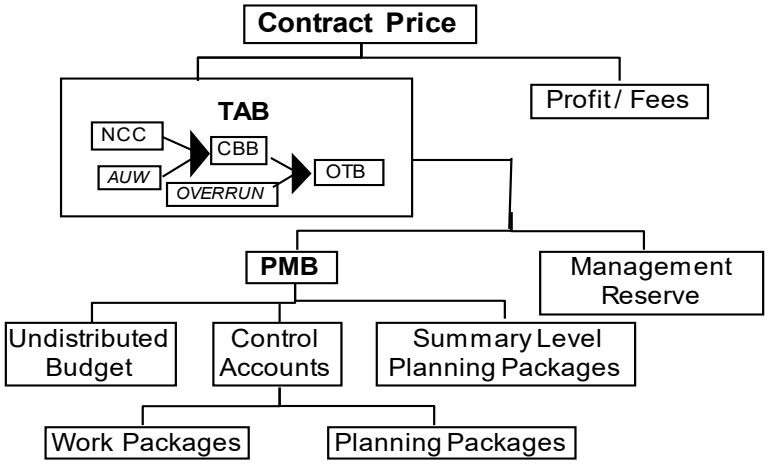
Schedule Efficiency SPI = BCWP / BCWS

Estimate at Completion

EAC = Actuals to Date + (Remaining Work / Efficiency Factor)

EAC_{Cost} = ACWP + [(BAC – BCWP) / CPI] = BAC / CPI

EAC_{Sked} = ACWP + [(BAC – BCWP) / SPI]



TERMINOLOGY

NCC	Negotiated Contract Cost	Contract price less profit / fee(s)	
AUW	Authorized Unpriced Work	Work contractually approved, but not yet negotiated / definitized	
CBB	Contract Budget Base	Sum of NCC and AUW	
OTB	Over Target Baseline	Sum of CBB and recognized overrun	
TAB	Total Allocated Budget	Sum of all budgets for work on contract = NCC, CBB, or OTB	
BAC	Budget At Completion	Total budget for total contract thru any given level	
PMB	Performance Measurement Baseline	Contract time-phased budget plan	
MR	Management Reserve	Budget withheld by Ktr PM for unknowns / risk management	
UB	Undistributed Budget	Broadly defined activities not yet distributed to CAs	
CA	Control Account	Lowest CWBS element assigned to a single focal point to plan & control scope / schedule / budget	
WP	Work Package	Near-term, detail-planned activities within a CA	
PP	Planning Package	Far-term CA activities not yet defined into WPs	
BCWS	Budgeted Cost for Work Scheduled	Value of work planned to be accomplished	= PLANNED VALUE
BCWP	Budgeted Cost for Work Performed	Value of work accomplished	= EARNED VALUE
ACWP	Actual Cost of Work Performed	Cost of work accomplished	= ACTUAL COST
EAC	Estimate At Completion	Estimate of total cost for total contract thru any given level; may be generated by Ktr, PMO, DCMA, etc. = $\mathbf{EAC_{Ktr\ /\ PMO\ /\ DCMA}}$	
LRE	Latest Revised Estimate	Ktr's EAC or EAC_{Ktr}	
SLPP	Summary Level Planning Package	Far-term activities not yet defined into CAs	
TCPI	To Complete Performance Index	Efficiency needed from 'time now' to achieve an EAC	

EVM POLICY: DoDI 5000.2, Table E3.T2. EVMS in accordance with ANSI/EIA-748 is required for cost or incentive contracts, subcontracts, intra-government work agreements, & other agreements valued ≥ $20M (Then-Yr $). EVMS contracts > $50M (TY $) require that the EVM system be formally validated by the cognizant contracting officer. Additional Guidance in Defense Acquisition Guidebook and the Earned Value Management Implementation Guide (EVMIG). EVMS is discouraged on Firm-Fixed Price, Level of Effort, & Time & Material efforts regardless of cost.

EVM CONTRACTING REQUIREMENTS:

Non-DoD FAR Clauses – Solicitation – 52.234-2 (Pre-Award IBR) or 52.234-3 (Post Award IBR)
Solicitation & Contract – 52.234-4

DoD(≥ $20M) DFAR Clauses - 252.242-7001 for solicitations and 252.242-7002 for solicitations & contracts

Contract Performance Report – DI-MGMT-81466A * 5 Formats (WBS, Organization, Baseline, Staffing & Explanation)
Integrated Master Schedule – DI-MGMT-81650 * (Mandatory for DoD EVMS contracts)
Integrated Baseline Review (IBR) - Mandatory for all EVMS contracts
* See the EVMIG for CPR and IMS tailoring guidance.

EVM Home Page = https://acc.dau.mil/evm eMail Address: EVM.dau@dau.mil
DAU POC: (703) 805-5259 (DSN 655)
Revised December 2006

Appendix 7-E: Sample Memorandum of Agreement

BETWEEN CMO AND THE COMPONENT PROGRAM MANAGER

WITH RESPECT TO

SURVEILLANCE OF INTEGRATED MANAGEMENT SYSTEMS

(IMPORTANT NOTE: This Memorandum of Agreement (MOA) is for guidance purposes only. It is intended to provide assistance in ascertaining that all of the appropriate aspects of Earned Value Management System (EVMS) surveillance are encompassed in the preparation of a specific surveillance plan. It is not intended that this MOA provide a mandatory, required format in any respect.)

1. Purpose

The purpose of this MOA is to establish the responsibilities of the (component PM) and the (Contract Management Office) with respect to EVM surveillance under all contracts issued by the (component PM). The agreement is based upon the policy and objectives of Part 2 Section 3 of the EVMS Implementation Guide and the DCMA Instruction/DCMA Guidebook.

2. Scope

This agreement describes the responsibilities and working relationships between the CMO and the PM, and the activities necessary to assure continuing effective contractor control, use, and reporting of cost, schedule, and technical performance within the purview of the EVMS requirements. This agreement is applicable to all (component PM) contracts performed at (Company), located in _____, which incorporate EVMS requirements.

3. Responsibilities

a. Program Manager:

(1) Provide overall management of the acquisition program, including support of the surveillance team, to assure continued contractor compliance with the EVMS.

(2) Provide routine feedback to the CMO on quality and utility of system surveillance efforts.

(3) Ensure that the CMO is kept fully-informed of pertinent program events, to include appropriate communications between the PM and the contractor. Program awareness is necessary so that the CMO may be fully-effective and responsive in providing the required support at all times.

(4) Request any problem analysis required beyond the scope of this MOA. Such requests are addressed to the CMO.

(5) Provide required specialized technical support needed for effective accomplishment of the EVMS surveillance program as requested.

b. CMO:

(1) Provide overall assurance that the contractor's integrated management system continues to meet the requirements of the EVMS guidelines.

(2) Develop and implement a joint surveillance plan which provides the details for accomplishing system surveillance and maintenance consistent with this MOA.

(3) Ensure the surveillance plan is a living document and continues to provide a framework for effective EVMS surveillance.

(4) Provide specialized support or problem analysis as agreed to in this MOA.

(5) Keep the PM advised of the status of contractor's integrated management system and EVMS related activities.

(6) Maintain records and submit reports as required by this MOA.

(7) Review and evaluate within 30 days of submittal, all proposed contractor integrated management system changes to determine EVMS compliance. If an ACO waiver to pre-approval of changes is granted, review changes and establish surveillance to ensure system integrity is maintained.

(8) Provide team member support, as available, for Integrated Baseline Reviews when requested by the procuring activity.

(9) Perform periodic evaluations of contract estimates at completion. Generate, when appropriate, independent EACs for submission to the program office and higher headquarters.

(10) Develop “Rules of Engagement” to effectively resolve EVM issues with the contractor and program office.

4. Surveillance Plan Framework

Details to be mutually determined by the PM and CMO in coordination with DCAA may include all or part of the following:

a. Assure continuity, consistency, quality, and usefulness of the system in operation. This includes the following:

(1) Assuring contractor commitment to EVM as a business practice, including effective surveillance.

(2) Assuring that the contractor's accepted integrated management system is, in fact, being used by the contractor to manage the program (e.g., attendance at routine contractor management program status meetings).

(3) Evaluating contractor generated changes to the system to ensure continued compliance with the guidelines.

(4) Assuring that system discipline and integrity are maintained.

b. Monitor the contractor's corrective actions resulting from surveillance findings and concerns.

c. Perform continuous analysis of the contractor’s EVMS to ensure system integrity. Frequency and level of detail are to be consistent with contract risk (e.g., compare CPI vs. TCPI for WBS element EACs, compare schedule variance vs. time based schedules for schedule accuracy).

d. Inform the contractor and PM of any uncorrected deficiencies which affect overall integrity of the contractor's system.

e. Receive, evaluate, reconcile, and process external contractor performance and financial reports, e.g., Contract Performance Reports, Contract Funds Status Reports, Integrated Master Schedule, Contractor Cost Data Reporting, etc. Verify that data is submitted in accordance with the reporting requirements.

5. Records Maintenance

The CMO establishes and maintains a central file for all pertinent data and correspondence regarding the EVMS requirements. The CMO assures that the file contains updated regulatory and guidance material pertaining to the program. The file, as a minimum, contains copies of all correspondence with the contractor and PM, system description, changes to the system, memoranda of meetings, monthly surveillance reports/activities, reconciliation of appropriate reports from the Contract Data Requirements List, and deficiency situations requiring corrective actions. Surveillance records are maintained until program completion and then forwarded for inclusion in the official contracts file. Electronic files are acceptable and encouraged.

6. Surveillance Review Meetings Among PM, CMO, and DCAA

This section provides for both scheduled and unscheduled joint meetings pertaining to the EVMS surveillance program.

7. Terms of Agreement

This agreement is effective upon signature by all parties. It is intended to remain in force for the duration of the specified contract(s); however, the terms of this agreement are subject to change at any time by mutual consent of the parties hereto.

APPROVED:

_____

CMO Director Date

APPROVED:

_____

Component Program Manager Date

Appendix 7-F: Glossary

Actual Cost – The costs actually incurred and recorded in accomplishing work performed.

Actual Date - The date on which a milestone or scheduled work task is completed.

Apportioned Effort – Effort that by itself is not readily measured or divisible into discrete work packages, but which is related in direct proportion to the planning and performance on other measured effort.

Authorized Unpriced Work – The value of authorized work on the contract that has not yet been definitized.

Authorized Work – Effort (work scope) on contract or assigned by management.

Budget At Completion (BAC) – The total authorized budget for accomplishing the program scope of work. It is equal to the sum of all allocated budgets plus any undistributed budget. (Management Reserve is not included.) The Budget At Completion will form the Performance Measurement Baseline as it is allocated and time-phased in accordance with program schedule requirements.

Contract Budget Base (CBB) – The Negotiated Contract Cost plus the cost of any Authorized Unpriced Work.

Control Account – A management control point at which budgets (resource plans) and actual costs are accumulated and compared to earned value for management control purposes. A control account is a natural management point for planning and control since it represents the work assigned to one responsible organizational element on one program work breakdown structure element.

Cost Variance – A metric for the cost performance on a program. It is the algebraic difference between earned value and actual cost (Cost Variance = Earned Value – Actual Cost). A positive value indicates a favorable position and a negative value indicates an unfavorable condition.

Critical Path – In a schedule network, the sequence of discrete work packages, planning packages, and lower level tasks and activities in the network that has the longest total duration through to a milestone (e.g., critical path to undocking) or to project completion.

Direct Costs – The costs of resources expended in the accomplishment of work which are directly charged to the affected program.

Discrete Effort – Tasks that are related to the completion of specific end products or services and can be directly planned and measured. (Also may be known as work packaged effort.)

Due Date – The date by which a milestone or task is scheduled to be completed.

Earned Value – The value of completed work expressed in terms of the budget assigned to that work.

Estimate At Completion (EAC) – The current estimated total cost for program authorized work. It equals actual cost to a point in time plus the estimated costs to completion (Estimate To Complete).

Estimate To Complete (ETC) – Estimate of costs to complete all work from a point in time to the end of the program.

Estimated Cost – An anticipated cost for specified work scope.

Estimated Completion Date – The date on which a scheduled milestone or task is currently expected to complete.

Indirect Cost – The cost for common or joint objectives that cannot be identified specifically with a particular program or activity. Also referred to as overhead cost or burden.

Internal Re-planning – Re-planning actions for remaining work scope. A normal program control process accomplished within scope, schedule, and cost objectives of the program.

Level of Effort – Unmeasured effort of a general or supportive nature usually without a deliverable end product. Examples are supervision and program administration.

Management Reserve – An amount of the total budget withheld for management control purposes rather than being designated for the accomplishment of a specific task or set of tasks.

Milestone – A schedule event marking the due date for accomplishment of a specified effort (work scope) or objective. A milestone may mark the start, an interim step, or the end of one or more activities.

Near Critical Path – In a schedule network, a sequence of lowest float or slack paths of discrete work packages, planning packages, and lower level tasks and activities that has the longest total duration nearest to the critical path.

Network or Network Schedule – A schedule format in which the activities and milestones are represented along with interdependencies between activities. It expresses the logic of how the program will be accomplished. Network schedules are the basis for critical path analysis, a method for identification and assessment of schedule priorities and impacts.

Organizational Structure – The hierarchal arrangement for the management organization for a program, graphically depicting the reporting relationships. The organizational structure will be by work team, function, or whatever organization units are used by the company.

Other Direct Costs – Usually the remaining direct costs, other than labor and material, such as travel and computer costs.

Over Target Baseline – Re-planning actions involving establishment of cost or schedule objectives that exceed the desired or contractual objectives of the program. An over-target baseline is a recovery plan, a new baseline for management when the original objectives cannot be met and new goals are needed for management purposes.

Performance Measurement Baseline – The total time-phased budget plan against which program performance is measured. It is the schedule for expenditure of the resources allocated to accomplish program scope and schedule objectives, and is formed by the budget assigned to control accounts and applicable indirect budgets. The Performance Measurement Baseline also includes budget for future effort assigned to higher Work Breakdown Structure levels (summary level planning packages) plus any undistributed budget. Management Reserve is not included in the baseline as it is not yet designated for specific work scope.

Performing Organization – The organization unit that applies resources to accomplish assigned work.

Planning Package – A logical aggregation of work, usually future efforts that can be identified and budgeted, but which is not yet planned in detail at the work package or task level.

Program Budget – The total budget for the program including all allocated budget, management reserve, and undistributed budget.

Program Target Cost – The program cost objective based on the negotiated contract costs, or the management goal value of the authorized work, plus the estimated cost of authorized unpriced work.

Resource Plan – The time-phased budget which is the schedule for the planned expenditure of program resources for accomplishment of program work scope.

Responsible Organization – The organizational unit responsible for accomplishment of assigned work scope.

Schedule – A plan that defines when specified work must be done to accomplish program objectives on time.

Schedule Traceability – Compatibility among schedule due dates, status, and work scope requirements at all levels of schedule detail (vertical traceability) and between schedules at the same level of detail horizontal traceability.

Schedule Variance – A metric for the schedule performance on a program. It is the algebraic difference between earned value and the budget (Schedule Variance = Earned Value – Budget). A positive value is a favorable condition while a negative value is unfavorable.

Statement of Work (SOW) – The document that defines the work scope requirements for a program.

Total Allocated Budget – The Contract Budget Base (CBB) plus any amount of OTB that has been applied for performance measurement.

Undefinitized Work – Authorized work for which a firm contract value has not been negotiated or otherwise determined.

Undistributed Budget – Budget associated with specific work scope or contract changes that have not been assigned to a control account or summary level planning package.

Work Breakdown Structure – A product-oriented division of program tasks depicting the breakdown of work scope for work authorization, tracking, and reporting purposes.

Work Breakdown Structure Dictionary – A listing of work breakdown structure elements with a description of the work scope content in each element. The work descriptions are normally summary level and provide for clear segregation of work for work authorization and accounting purposes.

Work Package – A task or set of tasks performed within a control account.

Appendix 7-G: Acronyms

AC	Actual Cost
ACAT	Acquisition Category
ACO	Administrative Contracting Officer
ACWP	Actual Cost of Work Performed
ANSI/EIA	American National Standards Institute/Electronic Industries Alliance
ASN(RD&A)	Assistant Secretary of the Navy(Research, Development and Acquisition)
AUW	Authorized Unpriced Work
BAC	Budget at Completion
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
C/FSR	Contract Funds Status Report
CA	Control Account
CAM	Control Account Manager
CAO	Contract Administration Office
CBB	Contract Budget Base
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CEVM	Navy Center for Earned Value Management
CFR	Code Of Federal Regulations
CMO	Contract Management Office
CPR	Contract Performance Report
CTC	Cost to Complete

CV	Cost Variance
CWBS	Contract Work Breakdown Structure
DAES	Defense Acquisition Executive Summary
DCAA	Defense Contract Audit Agency
DCAA FAO	Defense Contract Audit Agency Field Audit Office
DCMA	Defense Contract Management Agency
DFARS	Defense Federal Acquisition Regulation Supplement
DFARS PGI	Procedures, Guidance and Information
DoD	Department of Defense
DoD EVMIG	Department of Defense Earned Value Management Information Guide
DoDD	Department of Defense Directive
EAC	Estimate at Completion
ETC	Estimate to Complete
EVM	Earned Value Management
EVMS	Earned Value Management System
EVMSS	Earned Value Management Support Staff
FAR	Federal Acquisition Regulations
IBR	Integrated Baseline Review
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
KPP	Key Performance Parameter
LOE	Level of Effort
LRE	Latest Revised Estimate
MIL-HDBK	Military Handbook

MOA	Memorandum of Agreement
MR	Management Reserve
NAVSEA	Naval Sea Systems Command
NAVSEAINST	Naval Sea Systems Command Instruction
NAVSEANOTE	Naval Sea System Command (NAVSEA) Notice
NCC	Negotiated Contract Cost
NDIA	National Defense Industrial Association
NTE	Not to Exceed
OBS	Organizational Breakdown Structure
OMB	Office of Management and Budget
OTB	Other Target Baseline
OTS	Other Target Schedule
PDR	Preliminary Design Review
PERT	Program Evaluation Review Technique
PI	Program Integrator
PM	Program Manager
PMB	Performance Measurement Baseline
PMO	Program Management Office
PP	Planning Package
PST	Program Support Team
PV	Planned Value
RFC	Reviews for Cause
SLPP	Summary Level Planning Package
SME	Subject Matter Expert

SOW	Statement of Work
SPI	Support Program Integrator
SPO	Single Process Owner
SSOM	Standard Surveillance Operating System
SUPSHIP	Supervisor of Shipbuilding, Conversion and Repair, USN
SV	Schedule Variance
TAB	Total Allocated Budget
TCPI	To Complete Performance Index
TMP	Test Performance Measure
UB	Undistributed Budget
USD	Under Secretary of Defense
USD(AT&L)	Under Secretary of Defense (Acquisition, Technology and Logistics)
VAC	Variance at Completion
WBS	Work Breakdown Structure
WP	Work Package