National Defense Industrial Association

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Services Contracts and Earned Value Management (EVM)

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Introduction

In early 2007, the NDIA Program Management Systems Committee (PMSC) chartered a working group to develop and recommend policy, process guidance, and/or training to support the implementation of an Earned Value Management System (EVMS) on services work. In the collective experience of the PMSC, EVMS requirements had been applied to a broad variety of contracts for services, and these requirements frequently presented significant management challenges. It was generally accepted that EVM can be used to manage many types of services provided that the services contain certain characteristics that are prerequisite to the use of EVM and the contracts, which are used to acquire them, contain specific elements that enable EVM use by the Supplier. Therefore, in the absence of one or the other of these characteristics or contractual elements, other management techniques may be more appropriate and useful for managing the service contract.

This white paper provides an analysis of the challenges involved with implementing EVM on services work, and recommends methods for program managers and project control professionals to use for managing services contracts. In addition, because many of the management challenges associated with services contracts were traced directly to policy or contractual issues, this paper also contains recommendations for reviewing key federal policies and regulations to identify changes that may be required to improve the management of services contracts, as well as some change recommendations.

Challenges in Using EVMS to Manage Services

Federal guidance for applying either EVM or PBSA is written to be applied at the contract level. There are currently no provisions in the FAR for applying both EVM and PBSA to the same contract.

Service Contract Policy, found in FAR Part 37, prescribes the use of Performance Based Service Acquisition (PBSA) methods for acquiring services[1]. Contracts for services must include a performance work statement (PWS) that describes the work in terms of the required results and enables assessment of work performance against measurable performance standards. They must also require a Quality Assurance Surveillance Plan (QASP) that includes measurable performance methods for assessing supplier performance against the performance standards and performance incentives which correspond to the performance standards in the contract. These performance incentives may allow for increased payment for exceeding the standards or subject the supplier to payment reductions or reduced profits if the performance standards are not met.

The Office of Management and Budget (OMB) requires EVM for all capital acquisitions and other major acquisition programs involving development (i.e. project) effort. This requirement applies to all contract types, without

[1] Federal Acquisition Regulation (FAR) Part 37.102

exception. OMB also recommends that EVM be used on other than development contracts whenever possible. Under current OMB rules, programs falling short of their cost, schedule and technical objectives may risk reductions in funding or even cancellation; EVMS is required to track program progress to these objectives[2].

The NDIA PMSC EVMS Application Guide says that "Where work is discrete, EVM can be effectively employed. Where work is T&M/LOE, performance must be evaluated using other means that are not related to schedule milestones or measurement of progress." It goes on to say "For contracts issued in support of a program where the supplier does not control the work scope and schedule (such as a staff augmentation contract), EVMS requirements should not be applied to the contract itself but at the program level where scope, schedule and cost are present[3]." Unfortunately, program level EVMS is not yet well understood or even possible, as in the case of some customers lacking defined EVM processes or job cost collection capability, so suppliers are frequently faced with a requirement to apply EVMS to a contract effort where the basic contractual elements needed for EVMS application are not present.

The regulations governing the application of EVMS or Performance Based Service Acquisition do not address the fact that many contracts have work scope that includes both discrete projects and recurring services work. Best practice approaches for managing discrete project work use different methods to assess performance than those used for managing service work. In particular, project metrics measure progress toward a deliverable, which when accomplished will result in a benefit. Service level metrics measure benefits being received while the service is being performed. The challenges created when attempting to use one or the other approaches for both types of work scope are significant:

- Using one management methodology (EVM or Service Management) for both project and service efforts usually sacrifices visibility into the performance of the effort that the selected methodology was not designed to manage.
- Using EVM on contract types to which it has not been traditionally applied, e.g., on FFP or T&M contracts; on efforts combining development and services; or on efforts where both completion criteria and performance standards must be met, requires flexibility that many EVM systems were not designed for and typically don't provide.
- Contracting Officers' incorporation of EVMS clauses in solicitations and contracts, in response to OMB's requirement for EVMS on as many contract types as possible, without first analyzing the contract's component work elements (i.e., development or services, with differing performance objectives), results in contracts being structured (CLIN makeup, reporting requirements) in ways that can make it very

[2] OMB Circular A-11, Part 7, Capital Programming Guide
[3] National Defense Industrial Association (NDIA) Program Management Systems Committee (PMSC) Earned Value Management Systems Application Guide, March 2007, p. 21

difficult to overcome the inherent limitations of using EVMS in non-standard situations.

The following section addresses common approaches used to overcome these challenges and the limitations associated with each.

Current Approaches to Implementing EVM on Service Contracts

Because many service contracts frequently include EVMS clauses, it is not surprising that creative attempts to apply EVMS on service contracts have been undertaken over the past few decades. Some of the more common approaches are described in this section.

Measuring Service Performance Using LOE

Perhaps the most common approach, when EVMS is mandated, is to treat the services component as Level of Effort (LOE). This is especially true if the resource levels are fixed. Using the LOE method to measure performance on service work leads to several problems, and is one of the primary reasons that the PMSC began exploring the topic of applying EVM to service contracts. These problems include:

- A lack of visibility into the performance of the service effort.
- A distorted view of summary-level performance due to LOE offsetting unfavorable performance variances/trends, which may be occurring on the development or other discrete component of the work
- Inaccurate performance/progress reporting resulting from work performance being defined in ways that are contrived and not well supported by existing EVM systems.

"Projectizing" Service Work

Another common approach is to "projectize" those elements of service work where discrete output can be identified and/or scheduled. This method involves driving down to lower levels of task detail in order to find measurable completion points. The advantage of this approach is that it is often possible; nearly any recurring job is made up of many small process-oriented tasks that themselves have discrete start and finish points and identifiable completion criteria. Production runs of similar units or other repetitive service work, where similar work effort is delivered in planned quantities, can be successfully measured using EVM techniques. The disadvantage is that the planning and monitoring effort associated with managing a large number of small, non-repetitive or otherwise highly variable tasks is generally not cost effective.

The Other Side: Using Service Metrics (Performance Standards) to Track Project Performance

There are also instances of service programs attempting to use service management approaches for managing projects. One approach is to treat projects as managed changes within the service environment. This approach looks at projects as though they were any other change to the service offering, and measures only the result of the project and not progress toward completion. Drawbacks associated with treating projects as standard changes include:

- Provides no visibility into intermediate progress, allowing minor risks to become major problems.
- Does not support capture of key estimating and performance data that would lead to continuous improvement in project execution for the organization.
- Can lead to the decoupling of the program management system into separate project and service management systems. In an integrated service management environment the projects are used to improve the services, and should be considered part of the cost basis for the services that they support.

Analysis of Current Approaches

The PMSC has found that any of these approaches can be successful, depending on the program and the people involved. However, the limitations inherent in using a management approach that is not suited to the work being managed often lead to miscommunications and unintentional risk taking due to the lack of visibility into performance.

A better approach would be to implement an integrated management system capable of measuring the performance of all projects and service work happening on a program or contract. Attributes of an integrated management system include:

- Clear guidance on how to separate the project work from the services work to enable the application of the management methods best suited to each type of work in order to manage them appropriately.
- Metrics and reports that provide an overview of all work in a meaningful way that allows for problem areas to be identified and addressed at an early stage.

Best Practices for Implementing EVM on Service Contracts

When determining how to implement EVM methods on a services contract, the authors recommend a simple principle: treat project work like project work, and treat services work like services work. Use the WBS to segregate project work, which can be measured using completion milestones with defined completion criteria, and service work, which is recurring in nature and can be measured either in quantity of service delivered or by quality of service achieved in each period. The following recommendations should be useful on most contracts that have both a major service work component and a requirement to implement EVMS.

Use EVM as the Core Program Management Process

An EVMS that meets the ANSI-748 criteria can offer much that is of value to a service-based contract. Most of the standard program management processes related to planning and budgeting, work authorization, analysis, and change control are applicable to both project and service efforts. Common management processes shared by both projects and services include, but are not limited to:

- The use of a single work breakdown structure (WBS) to define the work effort and integrate planning, performance, and cost accumulation.
- The use of a WBS Dictionary to capture details about scope.
- The establishment and maintenance of authorized budgets.
- A Work Authorization process.
- The establishment of a plan baseline, including resource estimates and acceptable quality standards.
- The establishment of responsibility and authority matrices.
- The identification of key stakeholders and reporting requirements.
- Procedures for accumulating actual costs.
- Procedures for identifying and managing risks and opportunities.
- Procedures for managing authorized changes to the plan baseline or any project data under configuration management.

The processes that are not standard or not applicable to many services, such as scheduling[4] or the establishment of earned value milestones to measure the quantity of work completed, should be applied only to those

[4] In many instances, such as with a staff augmentation contract, the supplier is unable to schedule the effort because the schedule is prepared and managed by the customer. Similarly, traditional network schedules are inappropriate on many contracts for recurring or on-demand services because the volume and nature of the service cannot be anticipated in advance.

parts of the program that have project-like attributes. The key to achieving this separation cleanly lies in correctly structuring the WBS.

Use the WBS to Segregate the Project Work from the Services Work

Establishing a WBS that supports service management is crucial to getting management value from an EVMS when it is used on a service based contract. The WBS can be product based, process based, or a combination of both.[5] With a process based WBS, the cost variance metrics tell management about the productivity of the process. Both productive and unproductive trends provide management value and support corrective actions or positive recognition. They also support accurate EACs for specific legs of the WBS.

Standard Contract Performance Reports are still applicable provided that the analytical focus is shifted to productivity over schedule. On services contracts that are mostly LOE the emphasis will shift from schedule to cost performance. This approach when used in conjunction with Performance-Based assessments of quality, responsiveness, and acceptability, can provide significant management value and is a recommended best practice.

Use BCWP to Measure Performance Only on Quantitative Work

Budgeted Cost of Work Performed (BCWP), or Earned Value (EV), is the key EVM performance measure, and can be applied any time you want to compare an accomplished quantity of work to a planned quantity of work[6]. This method of tracking performance works equally well for measuring a series of individual deliverables, as in a project, or when measuring the production of units within lots, as in a manufacturing environment. Some service efforts resemble manufacturing lots in that they provide a recurring or predictable quantity of work; these services may also be measured using BCWP.

BCWP does not apply to service work where the performance is being measured in terms of quality rather than quantity. Common examples of qualitative service performance metrics include availability and reliability. A service metric that measures the percentage of time that e-mail is available to users during standard working hours, for instance, does not

[5] MIL-HDBK-881A notes that the WBS "…defines the program in terms of hierarchically related, product-oriented elements…" However, MIL-HDBK-881 applies only to work breakdown structures for eight specific categories of defense materiel items. Services efforts by definition are not products, and therefore require another basis for the creation of the program WBS.

[6] Standard EVM assumes that the work is of an acceptable quality level. A discussion of establishing acceptable quality levels and tying that to the measurement of BCWP is beyond the scope of this paper; suffice it to say that the earned value management methodology requires acceptable quality in the work being measured in order to provide useful performance metrics.

consider the number of e-mails sent. Similarly, a metric that tracks mean-time between failures does not reflect the absolute number of failures during the reporting period.

One way to help decide if BCWP should be used to track performance is to determine whether or not the performance can be made up in a later period if it falters in the current period. When performance on a project or in production of a manufacturing lot falls behind, the BCWP will be less than the budgeted cost of work scheduled (BCWS). Assuming the project or product run is not cancelled, the work will eventually be made up and BCWP will equal BCWS when it is all completed. Much of EVM analysis relies on this truism: that BCWP equals BCWS when the work is completed. In the case of a qualitative metric, however, there is no making up for missed targets in later periods. If the target for e-mail was that it be available 100% of the time during normal business hours during the month, and it was only available 90% of the time, there is no way to make it available 110% of the time next month and bring the variance back down to zero. Over time, if BCWP is used as a proxy for qualitative service metrics, variances will inevitably accumulate, and the program will show constantly increasing cumulative variances that a) must be explained in a formal report if you are using an ANSI-748 EVMS, and b) provide no meaningful management information.

Plan for Service Based Performance Measurement

Operational service cost elements should be reflected in the WBS, and will frequently be treated as LOE by standard EVM systems. Major projects or quantity-based services should be separated from ongoing operations efforts in distinct, identifiable branches of the WBS.

Measuring performance on Performance Based Service Acquisitions is often accomplished by establishing a service catalog, with agreed service levels and supporting performance standards. Where that is the case, the WBS provides the basis for service based costing. Service based costing is a key component of service management, and the WBS plays an integral role in supporting the service financial management process.

A significant difference between EVM performance measures and service based performance measures is that in an EVM environment the performance is always aligned with the costs at the WBS element level. This is not always true for services; in a service based performance environment the WBS cost elements are often allocated to one or more services in the service catalog based on service utilization rates or other criteria. Allocation of WBS costs to services is required when work in a single WBS element supports multiple services and it is not feasible to assign multiple cost accounts to the work. As an example, in a large data center the server administration team makes routine backups and patches on servers that support multiple IT services. Costs associated with this work would be collected in a single control account, but these costs would need to be mapped to the services in the service catalog in order to support cost accumulation by service.

In an integrated service management environment, a project will repair a broken service, improve an existing service, or implement a new service. Projects are thus considered a supporting element of the overall service offering, and project costs should be mapped into the services just like

the operational costs. For larger integrated service efforts it may be desirable to map entire project branches to one or more services. This practice can provide excellent visibility into the ROI of a proposed project, as well as objective "kill points" if project performance is not as expected.

The establishment of separate CLINs or even separate task orders for ongoing operations and major projects would facilitate the implementation of service based costing. Commercial EVM Systems do not typically support service cost mapping, but they do allow for planning and cost accumulation at the WBS level and therefore have the potential to be extremely useful as a data source and control mechanism for service financial management.

Choose the Right Tools

Currently, no single COTS system that we are aware of supports all of these recommendations. Implementing them is probably best achieved by using an EVM capable system and customizing some form of service cost map using a third party application. The cost mapping itself consists of merely assigning percentages of WBS costs to identified services, but the algorithms that determine the percentage can be challenging to develop and maintain. Each program will need to decide on the most effective manner of managing this mapping.

Next Steps: Suggested Reviews of Federal Policy

Federal policy currently makes the assumption that the determination of whether or not work scope is project or service based is made at the contract level. However, there are numerous examples of programs and contracts that have mixed scope, or that have undetermined scope at the time the contract is let. When project and service effort exist on the same contract, it is important for the acquisition manager to acknowledge that a) project and service management approaches have much in common, b) the segregation of work scope into project or service based can be made below the contract level, and c) the contract can be structured in a way that will enable the application of different management requirements, i.e., EVM or PBSA as required to support performance management. The following recommendations highlight policy areas that could be reviewed and enhanced to better support integrated program management.

WBS Guidance to Allow for Service Management Structures

It is very important to determine a single WBS at the program level to accommodate all work effort across all supplier- and government-performed effort. The acquisition plan should establish how the different

branches of the WBS will be measured and what management approaches will be required based on the type of work and the risk involved. For services work, this can involve using process-based work breakdown structures. No guidance currently exists at the federal level for process-based work breakdown structures. An examination of these types of structures, as well as integrated product and process based work breakdown structures, is recommended to support service acquisitions.

In a PBSA, the Government may issue an RFP with a Statement of Objectives (SOO) in lieu of a PWS for services work. The inclusion of a SOO in an RFP means the offeror will respond to the RFP with a PWS and will consequently need to develop a WBS structure for the contract that will accommodate EVM as appropriate. Service contracts and service efforts that meet the definition of a PBSA may, depending on the nature of the service and the specified performance standards, use EVM in order to meet the management and reporting capabilities required by the Government. Appendix A provides a sample decision tree for determining the application of management processes to an acquisition.

FAR and the Capital Programming Guide

The FAR and the Capital Programming Guide need to emphasize the government's responsibility to use the WBS process to structure the management and reporting requirements for all service contacts and services within major acquisitions. The FAR should also be reviewed and recommendations made to allow contracting officers the flexibility to establish EVM and PBSA management approaches as needed to achieve the program objectives. Additional effort in the development of PWS in support of PBSA will facilitate the achievement of the FAR requirements to use PBSA on services contracts to the maximum extent possible.

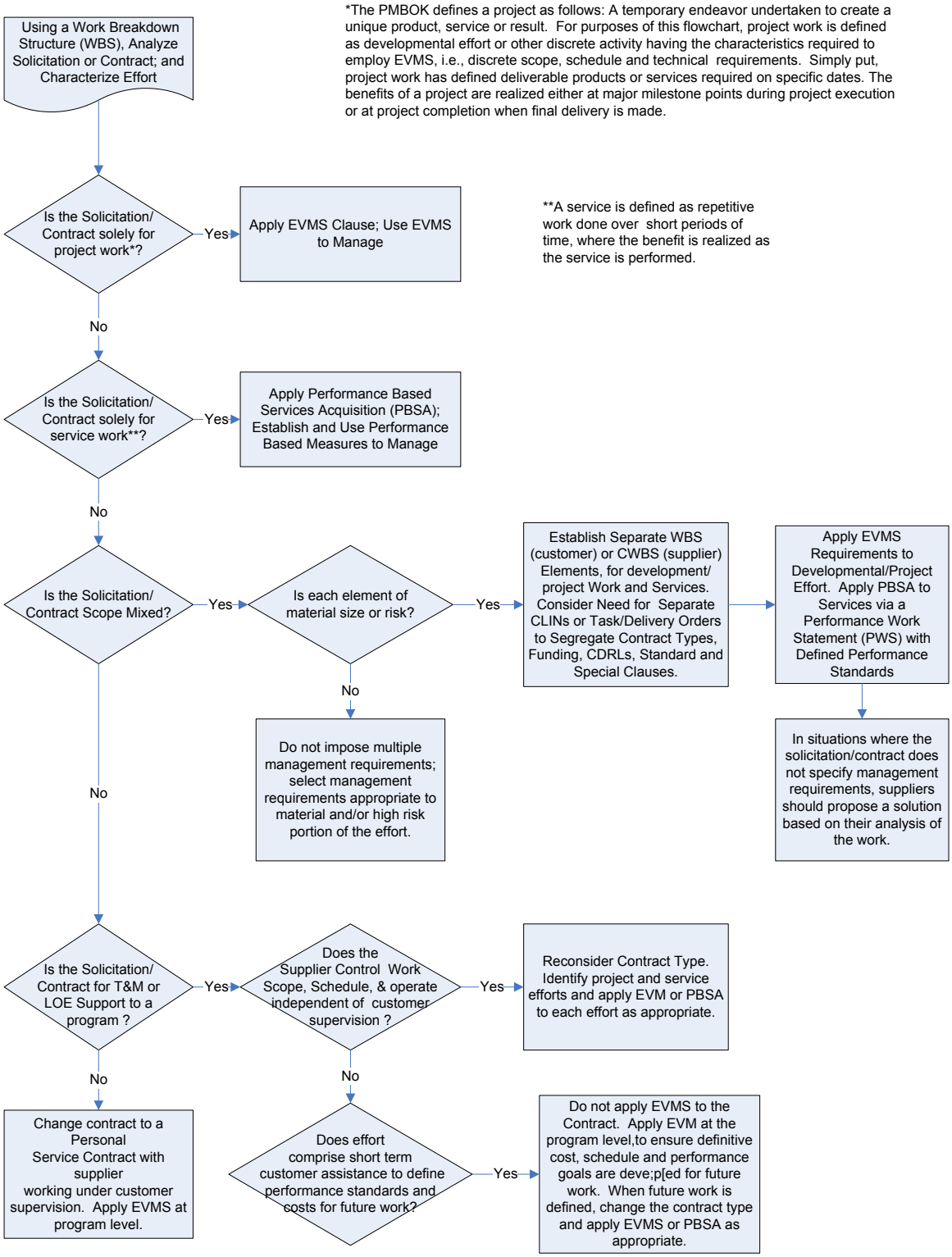
ANSI-748 EVMS Standard

An Earned Value Management System that meets the guidelines of the ANSI-748 standard addresses the majority of the common management processes required by both project and service efforts. A review of the ANSI-748 standard to determine its applicability to qualitative performance measurement should be undertaken and a determination made as to whether updates are needed to allow for more flexibility in applying performance measures as appropriate to the work being performed. A resulting Integrated Program Management System standard could institutionalize common program management approaches on all federal acquisitions and provide vendors with the requirements stability necessary to develop more useful tools.

Appendix A

The following decision tree may be helpful both for Acquisition Professionals in determining the solicitation requirements, as well as the optimal contract structure for the work elements involved, and for the Program Manager in selecting the technique(s) that will be used to manage the contract during its execution phase.

Decision Process Diagram for Management Process Selection Applicable to a Capital or Other Major Acquisition



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