

Earned Value Management Best Practices

CONTENTS

Best Practices for EVMS Use 1

 Use an EVMS Description and Keep it Up to Date..... 1

 Use EVMS on Every Project 2

 When to Use EVMS on a Program..... 3

Building a Work Breakdown Structure (WBS) 3

 WBS and Control Account Guidelines 3

 Defining a Control Account 4

Cost and Schedule Integration Guidelines 4

Earned Value Calculation Guidelines 5

Conclusion..... 5

BACKGROUND

Earned Value Management (EVM), a mainstay of major government project management, has now caught the imagination of government IT professionals as well as those in the private sector. This has happened because EVM offers, for the first time, an “apples to apples” methodology for understanding how projects are progressing in relation to the original funding and scope. It is a systematic approach to planning, measuring, and forecasting a project and a tool in the project manager’s toolbox for successfully completing an assigned project.

Earned Value Management Systems (EVMS) are required by the Office of Management and Budget for federal agencies and by contract on major systems acquisitions done by the U.S. Government and some foreign governments. They are also part of the Project Management Institute’s Project Management Body of Knowledge (PMI PMBOK) and are used by many civilian organizations.

The purpose of this white paper is to describe some best practices – gleaned from over thirty years of experience – of an Earned Value Management approach to project management.

BEST PRACTICES FOR EVMS USE

When it comes to using an EVMS, most organizations follow a learning curve. The purpose of this paper is to help organizations flatten the curve, arming them with EVMS best practices. These best practices are broken down into five guideline areas:

- EVMS description
- EVMS use
- Work Breakdown Structure (WBS) and Control Account
- Cost and schedule integration
- Earned Value calculation

USE AN EVMS DESCRIPTION AND KEEP IT UP TO DATE

The system description provides an understanding of each activity required to meet the EVMS standard and functions as the coordinating document for the processes involved in the EVMS. It also communicates the process within the contractor’s organization and to the customer or review team.

There is no specific government requirement for an Earned Value Management System description. The requirement is simply that the contractor or company must demonstrate compliance. Generally, companies choose to do this in a form that provides a description of the EVMS system and the contractor's comprehensive plan for meeting the guidelines in ANSI/EIA 748.

It is also a best practice to have supporting procedures. A system description and accompanying procedures support the next five best practices. These are necessary to consistently apply the same procedures on every project. This information establishes the process baseline, which is improved through time.

SUMMARY: BEST PRACTICE #1

- Have a system description that defines the management processes and detailed procedures to define specific steps.

USE EVMS ON EVERY PROJECT

Implementation of the Earned Value Management System depends on the need for insight and the ability to define the near-term work on every project.

If the EVMS practices are used on every project where there is a definition of work, they become "the way we have always done business." Each new employee is provided with on-the-job training/mentoring and formal training that includes these practices. Staff meetings use terms and acronyms related to those practices, and everyone knows what they mean.

Those are the ideal situations; consider some practical considerations and use scheduling as an example. If you tell the customer that there is one week of float in the project schedule, everyone has a good idea of what that means. Not many people know how to calculate float, but they have a grasp of the concept and the impact of the term "negative float."

In the same context, scheduling is applied to projects with different levels of complexity. A three-month project with two people can be scheduled with two or three tasks, no relationships, and tracked in a spreadsheet. A five-year billion dollar project that integrates different organizations probably warrants at least one dedicated scheduler and a sophisticated scheduling software system.

An EVMS takes a very similar approach. A three-month project with two people does not require strict reporting – it may be talked about over a cup of coffee – or multiple Earned Value measurement techniques, baseline control log, etc. On the other hand, it does require identification of the scope of work broken into deliverables, a time-phased plan, cost collection, and project progress identification. It also requires that an estimate of the cost and schedule at completion be available and accurate.

The five-year billion dollar project takes strict adherence to the system description. It is likely to require a Critical Path Method (CPM) schedule, regular analysis and reporting, and use all available EV measurement techniques.

Nothing works better to enforce acceptance and use of a practice than having executive management understand and use the data and ask questions that can only be answered by understanding and following that standard. For instance, if you are in a project review with the executive staff and someone asks, "How can you support this EAC (Estimate at Completion) when your TCPI (To-Complete Performance Index) is 13 points higher than your CPI (Cost Performance Index)?" and you can answer the question, that is an organization that uses EVMS as a way of doing business. For that to happen, EVMS needs to be understood at every level of management, and executive management must be trained and supportive of the process.

SUMMARY: BEST PRACTICE #2

- Use EVMS on every project so that it becomes a part of the organization's culture. This means that the EVMS must be scalable.

CASE STUDY – EVM BECOMES PART OF AN ORGANIZATION'S CULTURE

A Project Control Manager (PCM) worked at a major engineering and construction company. Each project had a PCM to manage the cost and schedule analysts and handle contracts and other duties. One of those other duties was to prepare a monthly EV status report that went to the VP of the division. This was done for all projects, commercial and government.

Every month the PCM sat in multiple status meetings and was not allowed to speak. The VP grilled the Project Manager on EV metrics and the Project Manager was unable to answer the question, deferring to the PCM. The VP then said to the Project Manager, "If the PCM is the only one who can answer my questions, why do I need you?"

The VP – who is now the President of that company – was emphasizing the importance of EVM and how all the key players in the organization needed to understand and use it.

WHEN TO USE EVMS ON A PROGRAM

The point in the project or program lifecycle that Earned Value Management is implemented should depend on the ability to discretely define the work that must be accomplished, a defined deliverable (data, products, or services), and the need for insight into the progress and performance.

If the implementation of the EVMS depends on the need for insight and the ability to define the near-term work, look back at the prior section "Use EVMS on Every Project." Many complex projects and programs are spending considerable funds early in the system concept and definition stage. This work, although often characterized as research and development, is often more development than research.

Research projects, which focus on the pursuit of knowledge rather than the creation of products, are difficult to measure and are not good candidates for EVMS. The objective of applied research is development of viable processes, solutions, materials, and components that are necessary for the success of the project and program. These types of efforts should employ EVMS and integrate that effort with the effort on the entire program or project.

SUMMARY: BEST PRACTICE #3

- EVMS is implemented on a project as soon as the work can be discretely defined.

BUILDING A WORK BREAKDOWN STRUCTURE (WBS)

WBS AND CONTROL ACCOUNT GUIDELINES

A common error in building a Work Breakdown Structure is the attempt to use a service instead of a product to define the scope of work. There is a tendency to define a project by engineering, manufacturing, and testing phases rather than by the deliverable product.

The concept of a Work Breakdown Structure is to define work with a product orientation. A contract is not delivering Engineering; it is delivering a machine, a building, a computer application, etc. Engineering is used to complete the product, but the scope and schedule are planned based on what will be delivered. There are services as deliverables, and these will be discussed later. There are also services that are deliverables with the product such as project management and lot acceptance testing, but those are the exception to the rule.

SUMMARY: BEST PRACTICE #4

- The WBS is product-oriented in its delivery.

Another part of the WBS concept is that no lower-level element is part of more than one higher-level element. This provides a strict summarization from the lowest level to the top. It prevents double counting and provides the ability to break down any performance data or trends at the project level to the lower-level contributors. It is a direct drill-down capability.

SUMMARY: BEST PRACTICE #5

- A lower-level WBS element summarizes to only one higher-level WBS element.

The only way to assure that a strict drill-down exists is to only plan, measure performance, and collect costs at the same level, but not necessarily at the same level as every other branch.

A WBS may have many branches, and each branch goes only to the level necessary to define the work adequately (see the Control Account description below). This means that one branch may go to level five and another only goes to level two. In each case, planning, statusing, and cost collection is done at the same level of that branch.

SUMMARY: BEST PRACTICE #6

- All planning, statusing, and cost collection are done at the same level of the WBS, and that level should not be artificially driven to a common level.

Another best practice is to keep the WBS at as high a level as possible and still provide adequate detail scope definition and planning. Every time you define the work one level lower, you are exponentially increasing the number of Control Accounts and the associated paperwork.

SUMMARY: BEST PRACTICE #7

- The WBS should go no lower than what is required to adequately define the scope of work and assign responsibility.

DEFINING A CONTROL ACCOUNT

When you have defined the WBS, the leaf-level element is assigned to one or more responsible organizations. Where one responsible organization has the scope of work to be performed on one leaf-level element of the WBS, a Control Account (CA) is defined. The Control Account has the plans for all performing resources, is tracked to reflect progress, and contains the charge account for cost collection for that work. The document containing the plan is commonly referred to as the Control Account Plan (CAP).

Determining the proper level of the WBS will have an impact on the size of the CA. The basic guidelines for CA sizing are primarily for labor resources. These tie to the standards for span of control, which suggest that a manager can most effectively directly manage eight to ten people. If you assume that the

average person earns \$100,000 per year with overhead, then a CA with ten people that lasts one year should account for about \$1,000,000 at total cost. That would suggest that a six-month CA is \$500,000 in labor.

If you find 12-month CAs that are half that size or less, the WBS is at too low a level. Conversely, if the average CA is twice that size or more, the WBS is too high and should go down another level.

Since far greater levels of material cost can be managed by a single manager, there are no real guidelines for non-labor. In each CA, it will be based on what a single individual can manage effectively. If your company average rates are different, use those rates to find a CA size.

SUMMARY: BEST PRACTICE #8

- Sizing for Control accounts should be about \$1,000,000 per year at burdened cost.

CASE STUDY – PLANNING TO THE RIGHT CONTROL ACCOUNT LEVEL

An Air Force contractor received a contract where the customer defined the WBS to level seven. The contractor mistakenly believed that they needed to plan to that level. As a consequence, the average Control Account was \$50,000 in size.

The Air Force used the WBS to make sure that the contractor understood their work scope. There was no intention for the contractor to plan to that level. When this was discovered, the CAs were created at level four of the WBS and the amount of paper, number of charge codes, and monthly reporting detail were reduced by 75%.

COST AND SCHEDULE INTEGRATION GUIDELINES

Cost and schedule integration has many interpretations. Literally, it only means that the budget planning must be spread over time, which is not very difficult. If there are 400 hours for a four-week task, then on average you plan 100 hours per week.

On the other hand, having cost spread across a critical path method (CPM) scheduling network has many advantages. The most obvious is that when a preceding task gets delayed, all successor tasks get moved, thus providing a more accurate plan for resource utilization and project completion.

Both methods are cost and schedule integration, and both have advantages and disadvantages. On a small project, CPM scheduling may be too costly in terms of time spent maintaining and explaining changes. On a large complex project, it may be the best way to see the impact on downstream work if a current task is delayed.

The result is that you should use the approach that makes the most sense for each project. This is similar to the discussion of when to use EVMS. The choice is based on size, complexity, and risk.

SUMMARY: BEST PRACTICE #9

- Full CPM scheduling should be used based on the size, complexity, and risk, but all planning must be time-phased.

EARNED VALUE CALCULATION GUIDELINES

Earned Value calculations are the basis of the analysis done on a project using EVMS. These calculations must be accurate, but they do not have to be very precise. For instance, how many decimal places in a percent-complete number are adequate? What level of precision do you need?

This is a matter of choosing the EVM technique to fit the Work Package. So once again, size, complexity, and risk are the deciding factors. If the Work Package is very large and/or the schedule is critical, you probably should not use a 0/100 technique. If the Work Package is less than one month in duration and has float in the schedule, a 0/100 technique is adequate.

In order to provide the accuracy and precision needed, the EVMS should provide at least eight or nine different methods of calculating EV. Those are:

- 0/100
- 50/50
- Percent complete
- Earned standards (mostly used in high-volume production environments)
- Milestone weights
- Milestone weights with percent complete
- Apportioned
- Level of Effort (LOE)
- Key events (LOE with milestones)

SUMMARY: BEST PRACTICE #10

- The required precision in EV calculations is based on size, complexity, and risk.

CONCLUSION

All projects need effective management. Projects that are complex, on the leading edge of technology, or that have other parameters that make them difficult and risky must have greater insight, control, and performance indicators to be successful. These projects can benefit the most from Earned Value Management and the employment of EVM best practices.

Contact Deltek

www.deltek.com
info@deltek.com
800.456.2009

Deltek (NASDAQ: PROJ) is the leading provider of enterprise applications software designed specifically for project-focused businesses. For more than two decades, our software applications have enabled organizations to automate mission-critical business processes around the engagement, execution and delivery of projects. More than 12,000 customers worldwide rely on Deltek to measure business results, optimize performance, streamline operations and win new business.

Deltek • 13880 Dulles Corner Lane, Herndon, VA 20171

US & Canada: 800.456.2009 or 703.734.8606 **UK:** +44 (0) 20 7518-5010

© 2008 Deltek, Inc. All rights reserved. All referenced trademarks are the property of their respective owners.

