Measuring the Value of Work Accomplishment

Part Three: What if the project workscope changes?
Does it invalidate the EVA?

Author's Note: This is the third in a series of articles on practical applications of the Earned Value Analysis concept. We will address common issues and misunderstandings about EVA and provide examples of very simple and practical uses of this extremely valuable tool.

A Basic EVA Concept

A basic premise of the Earned Value Analysis protocol is that we establish a project baseline and then evaluate progress against that target. The traditional EVA nomenclature uses this target, the BAC (Budget at Completion), as an essential component of the base formula. The planned effort to date, which we call the BCWS (Budgeted Cost of Work Scheduled), is calculated by multiplying the BAC by the planned percent complete. Schedule Variances are then determined by comparing the work accomplished to that plan.

So it is essential that a baseline (we'll call it a budget) be established and controlled.

Avoiding Scope Creep

The project management literature is overflowing with horror stories on scope creep. In the Information Technology area, especially, we are often hit with a double whammy. The project workscope keep escalating (often without providing additional funding or time) until the project runs out of time, money, or both … and then gets delivered with even less than the original planned content.

So there are several reasons to control the baseline and the project workscope. Even if we are not doing EVA, we need to have some means of containing the project workscope. This is not to say that additions to the workscope are necessarily bad and must be forbidden (I did have a client that felt that way). But rather, that we must <u>manage</u> the additions to scope, both for controlling project costs, and to maintain a valid baseline for earned value analysis. But, you've all heard this before. We all know that scope creep is something that we wish to avoid. However, our aversion to "control" seems to take precedence. We avoid the "C" word, at all costs, but then pay the costs, big time, for the lack of simple, but meaningful controls.

Some Simple Scope Management Methods

Let's look at a few examples for managing the workscope. This first example addresses issues associated with maintaining a valid baseline for EV measurements.

We'll assume that the project has been planned, and that a list of work items has been defined to support the project charter. This workscope matches the contents of an approved contract or an approved work authorization, and spells out the work to be performed to meet the commitment.

In many cases, this list of work items will have time and effort data associated with it, such as schedule dates, effort hours and costs. Following generally accepted project management practice, we freeze these data as a project baseline. We then proceed to execute the project, and track progress against the plan.

Separating Legitimate Changes from Performance Issues

Here's where the fun begins … and the project baseline gets infected with the black plague of the project world, the "uncontrolled-scope virus". It doesn't take long for the plan to change. In the initial weeks upon implementation, we often find that (1) we have left things out of the plan, (2) we have to change the way

that we will do the work, (3) some of the estimates for time, effort and costs have been challenged, and (4) the project sponsor or client has requested additions to the scope. To this, we add performance issues, such as it is taking longer to do the work and the estimated costs for materials did not hold up.

How do we contend with all of these perturbations and maintain a valid baseline for EVA? Let's take each of these situations and examine the practical alternatives.

1. **We have left things out of the original plan**. This is to be expected and it is appropriate to adjust the baseline plan early in the project to incorporate the better thinking that is available as the project gets into gear. The project team should establish a reasonable cut-off date for modifications to the baseline, say within five percent of the planned project duration. Caution! Additions should be associated with the approved project scope. These are not scope additions, but rather additions to the work items that comprise the approved scope.

2. **We have to change the way that we will do the work**. Ditto! We should also expect changes in project methodology as initial feedback comes in from the project participants. It is foolhardy to automatically resist changes just to preserve an early baseline, which may no longer be valid. Apply same rule as in (1), above.

3. **Some of the estimates for time, effort and costs have been challenged**. Here, again, we can expect that we will learn more about the work to be performed and its associated timing and costs. We should leave some room, early in the project, to incorporate such changes. Again, apply same rule as in (1), above.

4. **The project sponsor or client has requested additions to the scope**. Additions to the workscope should require justification, planning, and approval. Such additions should be accompanied by an increase in funding or the contract price. Before these additions are placed into the baseline plan, the work items should be identified and the work should be scheduled and budgeted. An audit trail should be maintained, so that any workscope additions can be traced back to the originator and the funding source.

5. **The planned work is taking longer than expected and costs have exceeded estimates**. Now, here's where we draw the line. The very reason that we are employing EVA techniques is to be aware of schedule and cost overruns. If we were to tinker with the BAC or BCWS for work items just because things are not going as expected, we would destroy the basis for the measurement and lose our ability to evaluate schedule and cost variances. So the rule here is plain and simple. We do not make changes to the baseline to accommodate poor performance. Rather, we maintain the baseline so that incidences of poor performance are disclosed.

Maintaining a Valid EVA Baseline

Summarizing the preceding paragraphs, we can adopt the following policy.

1. A preliminary baseline will be established, containing the project work items and estimates for time, effort and cost

2. Adjustment will be allowed to the above, early in the project, until the baseline is "frozen".

3. Additions to the baseline, due to additions to project workscope shall be fully identified as to work items, schedule, effort and cost and will only be accepted to the project baseline after such full definition and after valid authorization.

4. No changes shall be made just because the work is not going according to plan.

Managing Scope Creep

Now, let's address the situation discussed in (3), above, pertaining to additions to the authorized workscope. Here is a recommended procedure for maintaining both control over the workscope and maintaining a valid baseline for EVA.

1. Establish a standard practice for adding to the project workscope.

2. Provide forms, either printed or electronic, to facilitate the practice.

3. Identify roles, including who may originate a scope change and who may approve a scope change.

4. When a scope change is proposed, the work to be performed is to be fully defined, preferably as a list of work items (task, activities, whatever) with work breakdown structure ID's, schedule, effort, costs, as applicable to the current methods in place.

5. The source of funding is to be identified. Is the project budget being increased? Is it coming out of a contingency fund? Theoretically, work should not be added to the project database without an adjustment for the added costs.

6. Maintain a record of all scope changes.

By the way, scope changes can be negative. That is, they may involve a scope reduction. This is actually a legitimate means of balancing schedule, cost, quality and scope requirements, wherein the scope is reduced to meet schedule, cost and quality objectives. In the case of a scope reduction, the same procedure should be followed. The work items slated for removal should be deleted from the project baseline. Such changes should be fully documented and approved.

Note that this procedure may violate what is often presented as a project control axiom. We are often told that we create a project plan and freeze a baseline. Yet, in this proposed practice, we allow continual updating of this baseline. It is my belief that a project baseline is "managed", rather than "frozen". It should always reflect the plan values for all authorized work. However, the changes to the baseline must adhere to a rigid protocol.

Figure 1: A spreadsheet file for logging changes to project scope

CHANGE CONTROL: Summary and Log

	BASE	Chg #1	Chg #2	Chg #3	Chg #4	Chg #5
Task Budget		3000	2000	4000	3000	-2000
	100000	103000	105000	109000	112000	110000
Mgmt Reserve		-3000	-2000	0	-1500	0
	15000	12000	10000	10000	8500	8500
Margin		0	0	600	0	0
	15000	15000	15000	15600	15600	15600
Contract Total				4600	1500	-2000
	130000	130000	130000	134600	136100	134100
Effect on Schedule	15-Jun-92	15-Jun-92	25-Jun-92	15-Jul-92	15-Jul-92	15-Jul-92

Change #1	Forgot L.P. Materials – Add $3000 – Take from MR
Change #2	Conduit stuffed – Need extra – Add $2000 – Take from MR
Change #3	Add 20 phones and new IDF – Add to contract: $4000 + 15%
Change #4	Existing trunk line inadequate – Split $3000 cost
Change #5	Delete data lines from bldg A – Deduct $2000 from contract

A Simple Change Control Method

In Figure 1, we illustrate a simple spreadsheet-based method for logging changes to project scope. We will look at this illustration, both for an example of providing an audit trail of such changes, and for registering any changes to the project baseline for EVA purposes.

In this example of a telephone system installation project, we see that it is a commercial, for-profit, contract for an outside client. However, the basic approach can be applied to internally funded projects, with some modification. This example also supports my philosophy that divides the contract into three cost segments. Segment One, the Task Budget, includes all of the work that has been specifically identified and planned. This Task Budget is the original Baseline for the EVA. If we were employing a traditional CPM system for planning and control, its content would consist of all of the work items included in the Task Budget, including schedule, effort, and cost baselines.

Wouldn't it be grand if we were so wise as to be able to identify every work item at the onset of the project and even enjoy the benefit of foreseeing the future to pre-identify all potential problems? However, we have learned from experience that such is not the case. We somehow manage to omit some items from the original plan. And, sooner or later, a few unplanned problems will pop up. So we learn to allow a contingency for these perturbations. Segment Two, therefore, is what I call Management Reserve. It is a contingency amount (in this case 15%) that has been set aside (based on experience) for items that we expect to add to the project workscope, but have not yet been defined (because we don't know what they will be).

It is called Management Reserve because it is a fund that is to be managed, rather than a bucket of dollars available to any passer by. Funds are moved from Management Reserve to Task Budget only when a

specific cause is noted and the resulting work is planned. Funds so moved to the Task Budget become part of the revised EVA Baseline.

Segment Three is the Project Margin or profit. It is the Contract Price, less the Task Budget and the Management Reserve. At the conclusion of the project, unused Management Reserve, if any, becomes part of the profit. By the same rule, an overrun of either the Task Budget or the Management Reserve will eat into the profit.

Figure 1 shows the base dollars and schedule, plus an audit trail of five approved changes. Where the changes were not chargeable to the account of the client (and were not due to performance issues) dollars were moved from the Management Reserve to the Task Budget. In each of these (changes #1 & #2) additional work was defined and added to the project plan, and the EVA Baseline.

In change #3, the additions were chargeable to the client, and in change #4 the extra work was split with the client. The source of funding is immaterial to the Task Budgeting process. In each case, the extra work is defined and added to the baseline.

In change #5, we have a deletion from the workscope. The effect on Task Budget is similar. Only this time, we identify work to be removed, and the Task Budget and EVA Baseline are reduced.

Changing the Workscope while Maintaining a Valid EVA Baseline

Let's examine what we have gained from employing this simple, spreadsheet-based, change control system.

1. We have an audit trail of all changes
2. We maintain control over the Management Reserve fund, as well as the makeup of the contract dollars.
3. We have a negotiated and accepted change in the project completion date.
4. We have a valid basis for calculating schedule and cost variances for our EVA system

Imagine if we did not have such a change control system. What do we use as the project BAC? Is it $100,000 or $115,000? Which is fairer? To answer this, we'll look at a case where the project gets completed at a cost of $108,000.

If we use the lower budget figure ($100,000), and the project comes in at $108,000, then we are apt to report that the project had overrun the budget. Yet $10,000 of work had been added to the project. Would it be fair to penalize the project team for the overrun, when it really wasn't such?

If we use the higher budget figure, which includes the Management Reserve, ($115,000) then we give the team credit for cost performance that was not due to actual project performance but rather to unused contingency.

With our change control log and management system, we know just what the actual cost performance was. The project team spent $108,000 to do $110,000 of work. **A valid basis for Earned Value measurements was retained.**

Next month, we'll discuss "Managing the Baseline for Phased Projects"

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