Development of the NSF Process for Validation and Acceptance of Facility Project EVMS

Large Facilities Workshop 2016

Earned Value Management –
Certification or Verification?
Breakout Session

Purpose and Goals

NSF is establishing guidelines and requirements for Earned Value Management Systems (EVMS) for evaluating construction project status and management. Other federal agencies have established EVMS requirements, with varying ranges of rigor, depth of inspection, and involvement by external EVM professionals, that are based upon the 32 EIA Standard 748 guidelines.

Please provide thoughts and experiences on the impacts and benefits of EVMS evaluation to inform development of NSF EVM guidance and requirements for the 2017 revision to the LFM.

IG Recommendations for EVMS Validation and Certification:

"Obtain certification of AURA's EVM system for LSST and validate EVM data for LSST" OIG Alert Memo #15-3-001

"Validat(e) AURA's EVM data for DKIST, and certify AURA's EVM system." " OIG Alert Memo #16-3- 004

"In light of the critical insights robust EVM data can provide those managing and overseeing projects, NSF should …. take decisive action to ensure the quality of EVM data on all its large construction projects." *IG to US house of Representatives Subcommittee on Research and Technology, Feb 4, 2016*

IG Comments on EVMS Validation and Certification: OIG Alert Memos #15-3-001 and 16-3-004

"Certification of an EVM system is needed to ensure that an awardee maintains an acceptable EVM system, which includes data to support scheduling of work and interim progress measures, among other things. Our examination of thresholds other federal agencies use when determining whether an awardee's EVM system should be certified found thresholds of $10 million and $50 million…."

"Certification of an EVM system, including supporting data, is conducted by the Defense Contract Management Agency to ensure that an awardee maintains an acceptable EVM system.."

Terms

Validation: review and acceptance for compliance with EIA-748

Certification: typically refers to the DOD one-time issuance of a letter of acceptance by DCMA after validation. (once certified, EVMS can be used for multiple projects.)

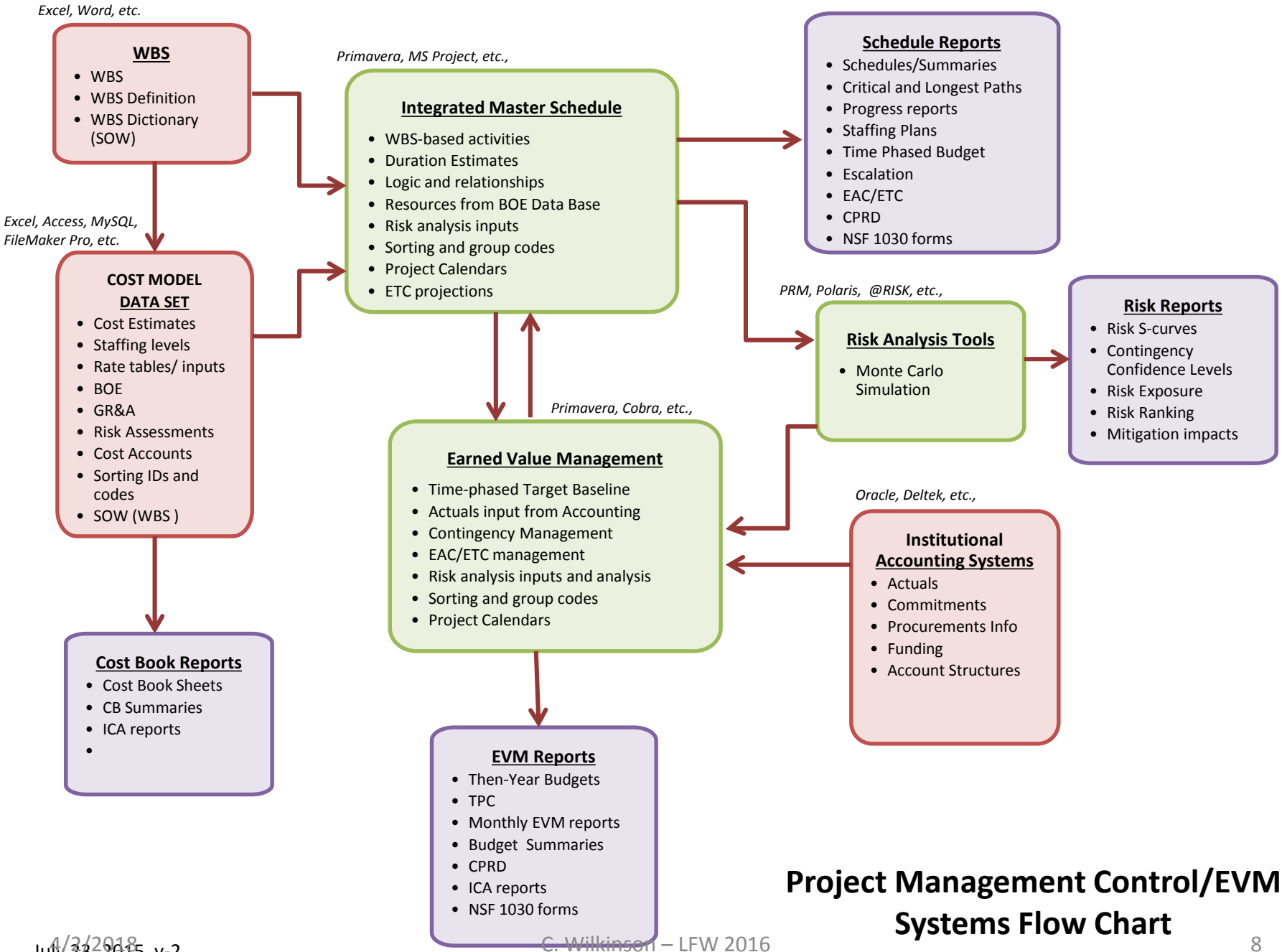
Surveillance: periodic reviews to verify proper implementation after initial validation and acceptance

Federal Agency Practices

- DOD, NASA use DMCA validation/certification requirements and DCMA professionals
- Many Non-DOD agencies use self-validation, peer validation, or other third-party validation according to various thresholds.
  - Third-party validation by EVM professionals most desirable for 'large capital acquisitions'
  - Acceptance/approval methods vary
- Validations can take months and $$$ - normally consist of initial visits, progress assistance visits for project corrections, and actual validation reviews (names vary by performing agency).

NSF Response to IG

- NSF is evaluating the benefits of EVM system validation/certification as a requirement for facilities projects.
- LFO performed a pilot validation of EVM data for LSST as part of the 2016 annual review process.
- LFO is drafting a Standard Operating Guide (SOG) for EVMS Validation
- Seeking community input on the impacts and benefits of EVMS validation implementation



Project Management Control/EVM Systems Flow Chart

NSF Pilot EVMS Evaluation of LSST

- Conducted in tandem but separate from annual review
- 3 Reviewers: certified EVM professional contractor, LFO staffer, and SME for telescope projects
  - Did not use DCMA reviewers
- 3 weeks of EVMS document reviews
- 2 days of on site interviews – AURA and LSST staff
- Issued report stating 'In compliance with areas for improvement' (not exactly acceptance/certification)
- Project response by next annual review (late 2016)
- Repeat surveillance by reviewing implementation at time of 2017 annual review
- Duration ~ 5 weeks with Cost to program ~$10K

Pilot Review Process

- Review documents for compliance with the 32 EIA-478 standards
- Interview project accounting, project controls, and project team members for knowledge and proper implementation against documentation and EIA-478 standards
- Use interview templates for consistency
- Fill out EIA-478 checklist and report findings

Steps to SOG

- Decide whether NSF uses DCMA certification or it's own version of written "acceptance/approval"
- Settle on thresholds and processes for review -> correct -> final review and acceptance/approval, including designating approvers
- Agree on qualifications and number of reviewers (3rd party EVMP versus DCMA)
- Improve interview templates and EIA-checklist as needed; create standard report and "acceptance" letter templates
- Determine timing and requirements for initial and follow-up surveillance reviews.
- Determine who pays for validation and surveillance reviews
- Differentiate deeper dive for initial review (pre-FDR) from surveillance reviews=> larger initial burden (time and money)
- Likely to require project implementation of EVM tools and processes during Final Design phase in order to be able to pass initial EVM validation as part of FDR.
- Determine process for dealing with chronic non-compliance

EVMS Guideline Compliance Review Checklist

Compliance Review Checklist (CRC) that correlates each guideline in ANSI/EIA-748 to the corresponding process in the program or project written management procedures.

a. For each of the 32 guidelines, state whether or not the program or project's documented management procedures meet the intent of the guideline.

b. Provide a corresponding reference to the program or project's written management procedures for each guideline.

c. Determine the proposed procedures for application of the EVMS requirements to suppliers per NSF guidelines for sub-awards and contracts.

Metrics for Grading whether the Intent of the ANSI guideline is met are

- High (Green) - satisfactorily meets all aspects of the guideline
- Medium (Yellow)- has non-critical issues with meeting some aspects of the guideline
- Low (Red) – fails to meet one or more critical aspects of the guideline

Guideline - ANSI/EIA-748-B	NSF-Adjusted Guideline Description	Team Lead(s)	Intent Met? High/ Med/ Low	Project Management Procedure Reference & Notes	Comments/Findings
Organization					
2-1a. Define Work Breakdown Structure (WBS)	1. Organize the authorized scope of work into a product-oriented work breakdown structure (WBS), with no co-mingling of funds in the defined elements. Tailor the WBS hierarchy such that sub-element and sub-work packages can be summarized up to higher levels and effective internal management control can be implemented. (LFM 3.4 Project Execution Plan)	Richard, Carol			
2.1b Define Organization Breakdown Structure (OBS)	2. Identify the project 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. (LFM 3.4 Project Execution Plan)	Richard, Carol			
2.2c Establish time-phased budget	8. Establish and maintain a time-phased, fully burdened budget baseline, at the control account level, against which project performance can be	Kellie, Richard			

Guideline - ANSI/EIA-748-B	NSF-Adjusted Guideline Description	Team Lead(s)	Intent Met? High/ Med/ Low	Project Management Procedure Reference & Notes	Comments/Findings
	measured. 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. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. If an over target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.				
2.2d Assign cost element categories to budgets for authorized work	9. Establish burdened budgets for authorized work with identification of NSF cost elements (labor, material, etc.) as needed for internal management and for control of contractors. (http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg_2.jsp#IIC2g)	Kellie, Richard			
2.2e Identify discrete work packages	10. To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.	Richard, Kellie			
2.2f All work package budgets and planning packages sum to control account	11. Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.	Kellie, Richard			
2.2g Identify and control LOE budgets	12. Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is not measurable or for which measurement is impractical may be classified as level of effort.	Kellie, Richard			

Guideline - ANSI/EIA-748-B	NSF-Adjusted Guideline Description	Team Lead(s)	Intent Met? High/ Med/ Low	Project Management Procedure Reference & Notes	Comments/Findings
2.2h Establish overhead budgets by organization element	13. Establish overhead budgets for each significant organizational component for expenses which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts of overhead that are planned as indirect costs.	Kellie, Richard			
2.1c Earned Value Management Systems (EVMS) integrated with WBS and OBS	3. Provide an earned value management system (EVMS), as part of the project management controls plan, for the integration of the planning, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the project work breakdown structure and the program organizational structure. (LFM 3.4 Project Execution Plan)	Carol, Kellie			
2.1d Identify Organization/Function for overhead	4. Identify the organization or function responsible for controlling overhead (indirect costs).	Kellie			
2.1e Create control accounts integrated with WBS and OBS for EVMS	5. Provide for integration of the project work breakdown structure and the project organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed. (LFM 3.4 Project Execution Plan)	Kellie			
Planning, Scheduling and Budgeting					
2-2a Create Integrated Master Schedule (IMS)	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 project. (LFM 3.4 Project Execution Plan)	Carol, Richard			
2.2b Identify interim measures for progress	7. Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.	Carol, Richard			

Guideline - ANSI/EIA-748-B	NSF-Adjusted Guideline Description	Team Lead(s)	Intent Met? High/ Med/ Low	Project Management Procedure Reference & Notes	Comments/Findings
2.2i Identify contingency budget	14. Identify cost and schedule contingency budget per LFM Sections 4.2 and 5.2.	Carol, Richard			
2.2j Reconcile the sum of all budgets with the Total Project Cost (TPC)	15. Provide that the program target cost goal is reconciled with the sum of all internal program budgets and contingency amounts.	Richard, Carol			
	Accounting Considerations				
2.3a Record direct costs from accounting system	16. Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.	Kellie			
2.3b Summarize direct costs into WBS without multiple allocation	17. 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.	Kellie			
2.3c Summarize direct costs into OBS without multiple allocation	18. Summarize direct costs from the control accounts into the organizational elements without allocation of a single control account to two or more organizational elements.	Kellie			
2.3d Record indirect costs	19. Record all indirect costs which will be allocated to the program consistent with the overhead budgets.	Kellie			
2.3 e Identify unit or lot costs	20. Identify unit costs, equivalent unit costs, or lot costs when needed.	Kellie			
2.3f Accurate material cost accumulation; simultaneous EVM measurement; full accountability of material	21. For EVMS, the material accounting system will provide for: (1) Accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques. (2) Cost recorded for accomplishing work performed in the same period that earned value is measured and at the point in time most suitable for the category of material involved, but no earlier than the time of actual receipt of material. (3) Full accountability of all material purchased for the program including the residual inventory.	Kellie, Richard			

Guideline - ANSI/EIA-748-B	NSF-Adjusted Guideline Description	Team Lead(s)	Intent Met? High/ Med/ Low	Project Management Procedure Reference & Notes	Comments/Findings
	Analysis and Management Reports				
2.4a Monthly control account summary and EVM metrics	22. On a monthly basis, generate EVM reports including the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system: (1) Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance. (2) Comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.	Richard, Carol			
2.4b Explain significant variances	23. Identify, on a monthly basis, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management. Provide plans for remediation.	Richard, Carol			
2.4c Identify and explain indirect cost variances	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.	Kellie			
2.4d Summarize data elements and variances for management reports	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.	Carol, Richard			
2.4e Implement management actions as a result of EVM analysis	26. Implement managerial actions taken as the result of earned value information. Negative cost and schedule variances greater than -10% require submission to NSF of a recovery plan with timeline for accomplishment.	Carol, Richard			
2.4f Revise cost and Schedule EAC and VAC on a periodic basis	27. Periodically develop revised estimates of EAC and end date forecast based on performance to date, commitment values for material, and estimates of future conditions.	Carol, Richard			