



Earned Value Management

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What is Earned Value Management (EVM)

- **Earned Value Management (EVM)** is a project management technique used for measuring project progress in an objective manner.
 - EVM combines measurements of
 - ❖ technical performance (i.e., accomplishment of planned work),
 - ❖ schedule performance (i.e., behind/ahead of schedule)
 - ❖ cost performance (i.e., under/over budget)
 - When properly applied, EVM provides an early warning of performance problems.
 - EVM promises to improve the definition of project scope, prevent scope creep, communicate objective progress to stakeholders, and keep the project team focused on achieving progress.



History of Earned Value Management

- **Late 1800's**
 - Industrial engineers developed original earned standards to measure factory production
- **Early 60's**
 - DOD began to use statistical analysis to measure plan execution (PERT)
- **1967-1996 Cost/Schedule Control Systems Criteria**
 - Developed 35 criteria imposed on contractors for major systems development programs
 - Provided successful oversight of contractor performance
 - Very rigid requirements that took emphasis off of the actual application of earned value
 - Never adopted by private industry because of extreme rigidity
- **1996-Present**
 - ANSI/EIA-748 which details 32 EVM criteria
 - Simplify the criteria (became guidelines) and removed some terminology
 - Adapted guidelines for outside DOD application
 - Policy moved Earned Value into all Federal Agencies
 - ❖ OMB Circular A-11 , FAR Subpart 34.2 and 52.234, HHSAR 334.2
 - Best practice project management tool



Earned Value at ASPR

- HHS Acquisition Policy Memo No. 2008 -02 (HHS Interim Guidance Concerning EVM) states based on OMB guidance EVMS is intended for developmental “major systems”.
 - Cites compliance with ANSI-748 EVM Guidelines
 - Contractors must be compliant with ANSI
- ASPR follows EVM Interim Guidance for all IT projects and construction contracts
- Biomedical projects may not meet “major systems” requirement
- ASPR implementing “7 Principles of EVM” requirements in place of ANSI-748 EVM Guidelines
 - Provides flexibility to ASPR and contractors
 - Removes requirement for contractor to be compliant with ANSI



Tiered Approach to EVM

- Tier 1
 - HHSAR requirement of full EVM requirement ANSI 748 compliant (334.2 and Full EVM-Contracts greater than or equal to \$25M and must be a facility or IT).
- Tier 2
 - Contracts greater than or equal \$25M , 7 Principles of EVM Implementation
- Tier 3
 - Contracts greater than \$10M and less than \$25M , 7 Principles of EVM Implementation but with greater flexibility and less requirements



Why Use Earned Value?

Well, I've spent 500 hrs. Does that mean I've accomplished 500 hrs of work?

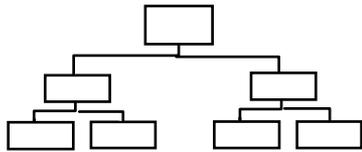


Actual Cost is not an indication of work progress, but only an indicator of hours/money spent.



Establish the Performance Measurement Baseline An Iterative 3-Step Process

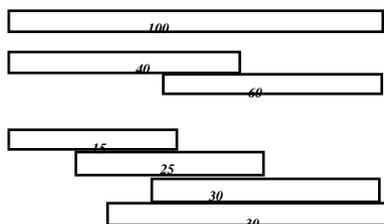
1. Define the Work



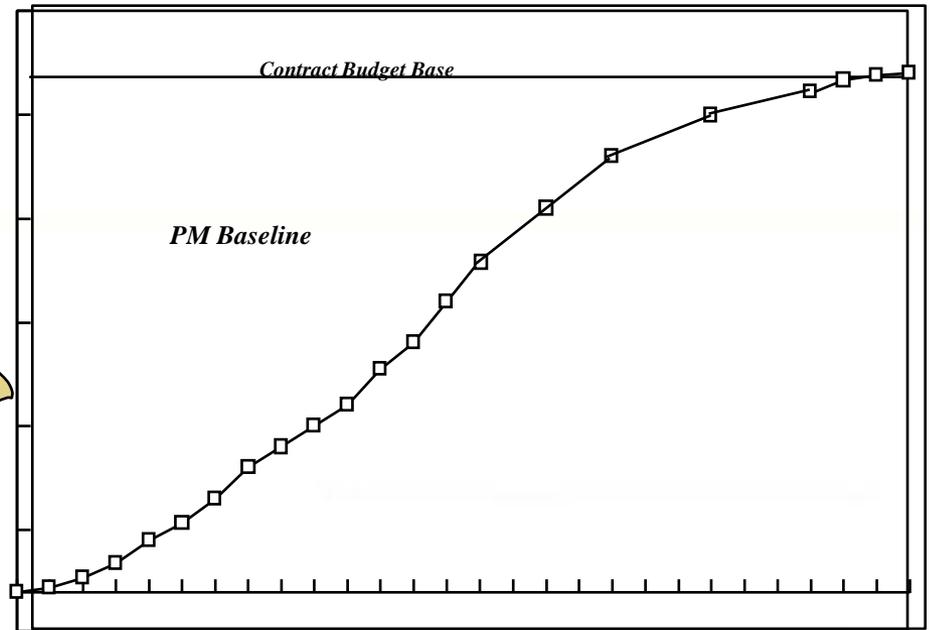
2. Schedule the Work



3. Allocate Budgets



\$



Time



Management Systems without Earned Value

In these systems, you budget work and then record actual expenditures.

Example: I budgeted 3 Consistency Lots at 200hrs per Lot. At the end of the month 500 hrs had been expended.

Budget (BCWS)	vs	Actual (ACWP)	Variance
600		500	100



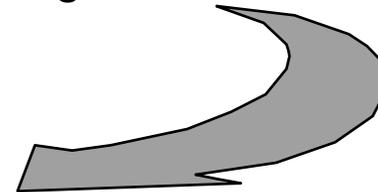
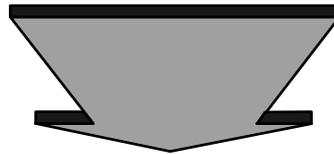
But what does this mean? Is this really the true status of work? What did I accomplish?



Earned Value Management

Earned Value adds a new dimension to traditional budget vs. actual tracking.

Earned Value
(BCWP)



Budget (BCWS)	vs	Actual (ACWP)	Variance
600		500	100



Management Using Earned Value

Earned Value - an objective measure of how much work has been accomplished.

Example: I plan to manufacture 3 Consistency Lots month. Each batch/lot should take 200hrs. I will measure Earned Value based on # batch/lots completed

Month End...

<u>Budget Plan</u>	<u>Earned Value</u>	<u>Actual</u>
600	400	500
(2 lots x 200 hours)		





Using Earned Value

<u>Budget Plan</u>	<u>Earned Value</u>	<u>Actual</u>
600 hours	400 hours	500 hours
	<u>Schedule Variance</u>	<u>Cost Variance</u>
	(200)	(100)

I've got 200 hours worth of work to catch up on and I've already overspent by 100 hours



Oh boy! I better figure out what is going on!



Why does ASPR use EVM?

- To ensure that contractors use effective, disciplined management control systems and procedures which provides data that:
 - Properly relate cost, schedule and technical performance
 - Are valid, timely and auditable
- Confidence in contractor's internal management system translate to ASPR receiving
 - Objective (rather than subjective) contract performance information
 - Cost and schedule impact of technical problems
 - Capability to trace problems to source (hardware, software, etc.) and responsible organization
 - Narrative analysis of problem identification, impact to the program and corrective action
 - Assist ASPR in identifying and managing risks
- Provides forecasting data that assist ASPR in managing funding requirements



Reporting Requirements for Tier 1 and 2 EVM Projects

- Will need to provide a monthly EVM report (Contract Performance Report)
 - Formats 1 and 5 (CAP report optional)
 - Control Account Plan
- Format 1 provides includes current, cumulative and at complete EVM data for each WBS reporting element. EVM data by Work Breakdown Structure
- Control Account Plan is an EVM document that shows the budget timephased by month for each work package rolled up to the control account. Also includes actual costs and budgeted cost of work performed (the earned value)
- Format 5 provides narrative explanation of cost, schedule and other problems related to total contract, Undistributed Budget and Management Reserve.
- Will provide Integrated Master Schedule status updates



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Integrated Baseline Review (IBR) / Performance Measurement Baseline (PMBR)

- A technical review will be scheduled 90-120 days after contract award.
- Contractor submits PMB documentation.
- ASPR will review documentation
- ASPR and Contractor will meet and discuss the baseline (budget/schedule/scope) and risks to the project.
- ASPR will execute a formal approval of the PMB
- Gain a sense of ownership in the cost/schedule management process
- Verify the Technical Content of the Performance Measurement Baseline
- Allows ASPR to obtain an understanding of the Performance Measurement Baseline and mitigate risk
- Gain a sense of ownership in the cost/schedule management process

CPR Format 1 Example

COST PERFORMANCE REPORT												Form Approved				
FORMAT 1 - WORK BREAKDOWN STRUCTURE												OMB No. 0704-0188				
1. CONTRACTOR a. NAME: ACME Construction b. LOCATION: Denver, CO				2. CONTRACT a. NAME: ACME Housing b. NUMBER: ACME - 1000 c. TYPE: FFP d. SHARE RATIO:				3. PROGRAM a. NAME: ACME Housing b. PHASE (X one) [] RDT&E [X] PRODUCTION				4. REPORT PERIOD a. FROM: 01-JAN-02 b. TO: 31-JAN-02				
5. CONTRACT DATA																
a. QTY 0		b. NEG COST \$183,852		c. EST COST AUTH UNPR \$0		d. TGT PROFIT/FEE \$36,147 / 20.00%		e. TGT PRICE 219,999		f. EST PRICE 219,999		g. CONT CEILING 0		h. EST CEILING 0		
6. EST COST AT COMPLETION				MGMT EST AT COMPL (1)		CONT BUDGET BASE (2)		VARIANCE (3)		7. AUTHORIZED CONTRACTOR REPRESENTATIVE						
a. BEST CASE				\$227,009						a. NAME (Last, First, Middle Initial) Ted Smith			b. TITLE Manager			
b. WORST CASE				\$165,467						c. SIGNATURE			d. DATE SIGNED 31-JAN-02			
c. MOST LIKELY				\$226,158		\$183,852		-\$42,306								
8. PERFORMANCE DATA				CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
ITEM (1)	BUDGETED COST		ACTUAL COST WORK PERF (4)	VARIANCE		BUDGETED COST		ACTUAL COST WORK PERF (9)	VARIANCE		BUDGET (12)	EST (13)	VAR (14)			
	WORK SCHED (2)	WORK PERF (3)		SCHED (5)	COST (6)	WORK SCHED (7)	WORK PERF (8)		SCHED (10)	COST (11)						
1.1.1 Concrete	9,670	8,757	26,150	-912	-17,393	9,670	8,757	26,150	-912	-17,393	11,465	28,873	-17,368			
1.1.2 Framing	7,089	5,355	6,250	-1,734	-895	7,089	5,355	6,250	-1,734	-895	27,147	28,041	-893			
1.1.3 Plumbing	0	0	0	0	0	0	0	0	0	0	5,704	5,704	0			
1.1.4 Electrical	0	0	0	0	0	0	0	0	0	0	14,070	14,070	0			
1.1.5 Interior	0	0	0	0	0	0	0	0	0	0	6,328	7,178	-850			
1.1.6 Roofing	0	0	0	0	0	0	0	0	0	0	1,730	1,730	0			
OVERHEAD	16,062	14,317	0	-1,745	14,317	16,062	14,317	0	-1,745	14,317	75,684	61,371	14,313			
b. COST OF MONEY	19	17	0	-3	17	19	17	0	-3	17	62	65	17			
c. GEN & ADMIN	5,429	4,702	0	-726	4,702	5,429	4,702	0	-726	4,702	23,237	18,537	4,700			
d. UNDISTRIBUTED BUDGET											0	0	0			
e. SUBTOTAL (PM Baseline)	38,269	33,149	32,400	-5,120	749	38,269	33,149	32,400	-5,120	749	165,467	165,569	-102			
f. MANAGEMENT RESERVE											18,385					
g. TOTAL	38,269	33,149	32,400	-5,120	749	38,269	33,149	32,400	-5,120	749	183,852					

CAP Example

CAP:		1.1.1 Drug Production			Month End:		3/31/2011								
Control Account Performance		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total	
BCWS		200	30	30	40	60	80	60	80	15	25	30	25	675	
BCWP		10	190	60											
ACWP		12	190	60											
SV		-190	160	30											
CV		-2	0	0											
Resource Summary		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total	
Labor		10	10	10	10	10	10	10	10	10	10	10	10	120	
Sub DB			20	20	30									70	
Sub DP						50	70	50	70					240	
Sub Pack											5	20	15	40	
Material		190												190	
ODC										5	10			15	
BCWS		200	30	30	40	60	80	60	80	15	25	30	25	675	
Work Package Summary		EVM	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
Sub Contract Management	LOE		10	10	10	10	10	10	10	10	10	10	10	120	
Purchase Materials	0/100		190											190	
Manufacture Drug Substance	MS			20	20	30								70	
Manufacture Drug Product	MS						50	70	50	70				240	
Ship	Units										5	10		15	
Package & Store	Units											5	20	15	
BCWS			200	30	30	40	60	80	60	80	15	25	30	25	675

CPR Format 5 Example

WBS: 1.1		Manager: Phillips					
Desc: House Building Project		Charge #:					
(EAC - Actuals thru JAN-02 + ETC)							
TOTAL \$\$	BCWS	BCWP	ACWP	SCHED-VAR	%	COST-VAR	%
Mon Hours	389	328	0	-61	-16	328	100
Cum Hours	389	328	0	-61	-16	328	100
Mon Dollars	38,269	33,149	32,400	-5,120 *	-13	749 *	2
Cum Dollars	38,269	33,149	32,400	-5,120 *	-13	749 *	2
BAC Hours	1,732	EAC:	1,404	VAC:	328	19	
BAC Dollars	165,467	EAC:	165,569	VAC:	-103 *	0	
PROBLEM ANALYSIS:				(* - requires explanation)			
The schedule variance is due to delays in completing the framing of the exterior walls. This delay is caused by both material shortages and availability of qualified resources.							
The cost variance is due to increased productivity in installing the patio. The concrete subcontractor developed a faster way of forming a pour the stairway.							
TASK/PROJECT IMPACT:							
Framing the exterior walls will be completed on schedule and no delay will occur to the project complete.							
CORRECTIVE ACTION PLAN:							
The current skill mix will be adjusted to complete this activity as scheduled. The ACME project management team is conducting a review of all future work to determine if resource availability will be an issue.							
Preparer:		Dept:		Initials:		Date:	
Approval:		Dept:		Initials:		Date:	

Header information includes quantified cost and schedule variances and indicates out of tolerance items. Explanations may be required for monthly, cumulative, and at complete variances.

Problem Analysis:
This section is used to explain the variance drivers, abnormal conditions and factors creating variances, and other issues, problems, and concerns.

Task/Project Impact:
This section is used to explain the impact to the Control Account and overall Project.

Corrective Action Plan:
This section provides the recovery and risk mitigation plan.



PHE.gov

- Section on Earned Value Management
- Will list the 7 Principles of EVM
- Will provide Intent Guides for Tier 1,2, and 3 Implementations

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7 Principles of EVM

- Plan all work scope to completion
- Break down the program work scope into finite pieces that can be assigned to a responsible person or organization for control of technical, schedule and cost objectives
- Integrate program work scope, schedule, and cost objectives into a performance measurement baseline plan against which accomplishments can be measured. Control Changes to the baseline
- Use actual costs incurred and recorded in accomplishing the work performed
- Objectively assess accomplishments at the work performance level
- Analyze significant variances from the plan, forecast impacts, and prepare an estimate at completion based on performance to date and work to be performed
- Use EVMS information in the company's management processes

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7 Principles of Earned Value Management Tier 1 System Implementation Intent Guide

DRAFT
 01 July 2011

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7 Principles of Earned Value Management Tier 2 System Implementation Intent Guide

01 May 2011



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Questions?

