

1 EDO Study Guide

1.1 Earned Value Management (EVM)

Refs: [1] “3.6.1. Introduction to EVM” Mar. 26, 2025.

[2] “3.6.2. EVM Data Analysis” Mar. 26, 2025.

1.1.1 What EVM is

Earned Value Management (EVM) is a project management technique that integrates scope, schedule, and cost to assess project performance and progress. It provides a quantitative measure of project performance by comparing the planned work with the actual work completed and the associated costs. EVM is widely used in government and defense projects to ensure that projects are delivered on time and within budget.

1.1.2 Key Components of EVM

Source: 3.6.1. *Introduction to EVM*, 3.6.2. *EVM Data Analysis*, 2025, 2025 [1, 2]

Planned Value (PV) / Budgeted Cost of Work Scheduled (BCWS) : The budgeted cost for the work scheduled to be completed by a specific date.

Earned Value (EV) / Budgeted Cost of Work Performed (BCWP) : The budgeted cost for the work actually completed by a specific date.

Actual Cost (AC) / Actual Cost of Work Performed (ACWP) : The actual cost incurred for the work completed by a specific date.

Budget at Completion (BAC) : The total budget allocated for the project.

Estimate at Completion (EAC) : The forecasted total cost of the project based on current performance.

Cost Performance Index (CPI) : A measure of cost efficiency, calculated as $CPI = EV/AC$. A CPI less than 1 indicates a cost overrun.

Schedule Performance Index (SPI) : A measure of schedule efficiency, calculated as $SPI = EV/PV$. An SPI less than 1 indicates a schedule delay.

Schedule Variance (SV) : The difference between the earned value and the planned value, calculated as $SV = EV - PV$. A negative SV indicates a schedule delay.

Cost Variance (CV) : The difference between the earned value and the actual cost, calculated as $CV = EV - AC$. A negative CV indicates a cost overrun.

Info

The first three are equivalent terms and should know both. This guide will use the first set (PV, EV, AC)

1.1.3 When to Use EVM

EVM is typically used in projects that have well-defined scopes, schedules, and budgets. It is particularly useful for large, complex projects where tracking performance is critical to project success. EVM can be applied at various levels of a project, from the overall project level to individual work packages or tasks. It is often mandated for government contracts, especially in defense and aerospace sectors, to ensure accountability and transparency in project management. Hard requirements for EVM compliance may be specified in the contract terms and for the following [1]:

- Nature of the work is discreetly measurable and...
- Cost contracts of \$20 million or more.
- Cost contracts of \$100 million or more must be formally validated by Defense Contract Management Agency (DCMA).
- Integrated Program Manager's Data Analysis Report (IPMDAR) and Integrated Baseline Review (IBR) are required when EVM is required.

1.1.4 EVM Compliance

- Contracts must comply with guidance use EVM as a tool.
- DCMA enforces compliance with validation and surveillance.
- Defense Contract Audit Agency (DCAA) and other specialized agencies may also be involved in audits and reviews.

1.1.5 EVM Principal Players

Source: 3.6.1. *Introduction to EVM*, 2025 [1]

- Program Management Office (PMO)—Procurement Activity
- DCMA—Department of Defense (DoD) EVM Executive Management
 - Ensures EVM integrity and effectiveness
 - Maintains contractor info acceptance and schedule performance
 - Conducts IPMDAR and Integrated Master Schedule (IMS) reviews
- DCAA—Contract Auditor
 - Audits contractor cost data
 - Verifies EVM data accuracy
 - Ensures compliance with accounting standards
- Acquisition Data and Analytics (ADA)—Focal point for policy, guidance and competency relating to EVM
- Department of the Navy (DON) Center for EVM—Navy's central point of contact and authority for Navy EVM
- Supervisor of Shipbuilding (SUPSHIP)—Fills many DCMA and DCAA roles for shipbuilding contracts

1.1.6 PMB

Figure 1.1 shows the “S”-shaped curve showing the cumulative PV/BCWS. Figure 1.2 shows the workflow from defining the Statement of Work (SOW) to final Performance Measurement Baseline (PMB) adjustments. PMB’s are:

- Scoped, scheduled, and budgeted work plan
- Time-phased for authorized work
- Basis for cost and schedule
- Effectively the PV for the entire project

PMB DEVELOPMENT

STEP 1: *Define All Work.* Work is broken down by Work Breakdown Structure (WBS) and it intersects the organization structure. Control accounts are natural management points for organization elements on one program WBS element. Control Account Managers (CAMs) are assigned to each control account. Control accounts contain work packages and planning packages.

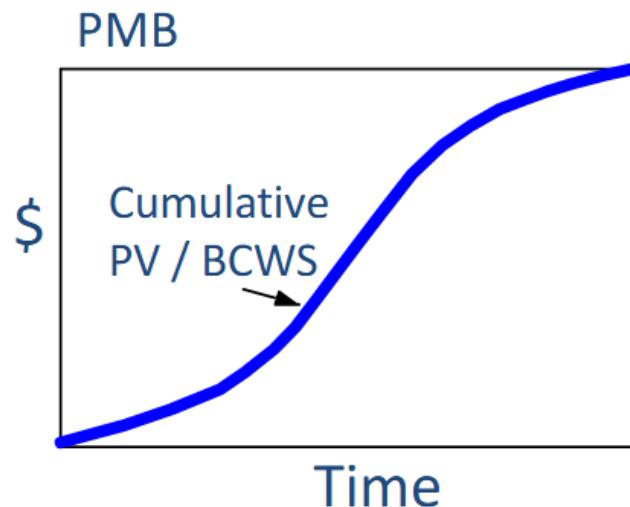


FIGURE 1.1: PMB Cost v.s. Time chart showing the “S”-curve. Source: 3.6.1. Introduction to EVM, 2025 [1].



FIGURE 1.2: The development flow for PMB. Source: 3.6.1. Introduction to EVM, 2025 [1].

STEP 2: *Schedule the Work.* This is the basis of the time-phased budget. Master schedule includes milestones and work is broken down by WBS and sequenced. The most common illustration of this is the Gantt chart.

STEP 3: *Budget the Work.* Assign a budget to each piece of work. Retain a management reserver for known-unknowns (**in-scope** tasks). The budget should also be time-phased.

Changes to the PMB must be formally controlled and documented. Reasons for changes include:

- Contract changes
- Internal replanning
- Formal reprogramming

1.1.7 EVM Reviews and Reports

Source: 3.6.1. *Introduction to EVM*, 2025 [1]

POST-ACCEPTANCE REVIEW

- Ensure accurate performance data
- Done prior to the IBR
- Led by Review Director, normally DCMA
- Review Director prepares report

INITIAL COMPLIANCE REVIEW

- Validates the Contractor's EVM system
- Done prior to the IBR
- Lead by DCMA Review Director
- Review Director prepares report

INTEGRATED BASELINE REVIEW

- The Contractor, Program Manager (PM) and/or Deputy PM, DCMA/DCAA/SUPSHIP personnel, and technical staff—as appropriate—joint assessment conducted to verify realism and accuracy of the PMB
- Must be done within six months of contract award

INTEGRATED PROGRAM MANAGEMENT DATA ANALYSIS REPORT

This is a contractually required report the Contractor prepares to show performance data derived from their EVM. It should provide the status of cost and schedule. It is required on any contract requiring EVM and must be provided monthly, at minimum. There are six formats:

1. WBS (most common)
2. Organizational categories
3. Program Management Baseline
4. Staffing
5. Explanation and Problem Analysis
6. IMS

A Contract Funds Status Report (CSFR) provides funding information. It is based on IPMDAR data but informs *price* rather than cost [1].

1.1.8 EVM Data Analysis

Figure 1.3 shows the “S”-curve for the EVM variables. The differences between the different lines are the variances

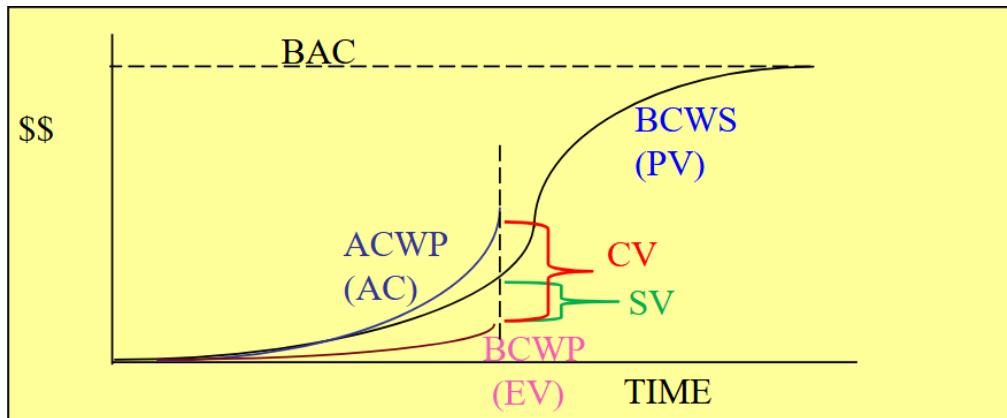


FIGURE 1.3: EVM chart showing the independent variables and variances. Source: 3.6.2. EVM Data Analysis, 2025 [2]

EQUATIONS

$$CV = EV - AC$$

$$SV = EV - PV$$

$$CPI = \frac{EV}{AC}$$

$$SPI = \frac{EV}{PV}$$

$$CV\% = \left(\frac{CV}{EV} \right) * 100$$

$$SV\% = \left(\frac{SV}{PV} \right) * 100$$

$$\% \text{ Complete} = \left(\frac{EV}{BAC} \right) * 100$$

$$\% \text{ Spent} = \left(\frac{AC}{BAC} \right) * 100$$

$$EAC = \frac{BAC}{CPI}$$

$$EAC = AC + \frac{BAC - EV}{(EV/AC)^{\text{3 months}}}$$

$$EAC = AC + \frac{BAC - EV}{CPI \times SPI}$$

$$EAC = AC + \frac{BAC - EV}{(0.8)(CPI) + (0.2)(SPI)}$$

$$VAC = EAC - BAC$$

$$TCPI = \frac{\text{Work remaining}}{\text{Work performed}}$$

$$TCPI_{EAC} = \frac{BAC - EV}{EAC - AC}$$

$$TCPI_{BAC} = \frac{BAC - EV}{BAC - AC}$$

Acronyms

Acronym	Definition
AC	Actual Cost
ACWP	Actual Cost of Work Performed
ADA	Acquisition Data and Analytics
BAC	Budget at Completion
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
CAM	Control Account Manager
CPI	Cost Performance Index
CSFR	Contract Funds Status Report
CV	Cost Variance
DCAA	Defense Contract Audit Agency
DCMA	Defense Contract Management Agency
DoD	Department of Defense
DON	Department of the Navy
EAC	Estimate at Completion
EV	Earned Value
EVM	Earned Value Management
IBR	Integrated Baseline Review
IMS	Integrated Master Schedule
IPMDAR	Integrated Program Manager's Data Analysis Report
PM	Program Manager
PMB	Performance Measurement Baseline
PMO	Program Management Office
PV	Planned Value
SOW	Statement of Work

Acronym	Definition
SPI	Schedule Performance Index
SUPSHIP	Supervisor of Shipbuilding
SV	Schedule Variance
WBS	Work Breakdown Structure