Setting Up an Earned Value Management System (EVMS): Approach and Lessons Learned

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Outline

• Describe the activities taken to establish an Earned Value Management System (EVMS) for visibility to the technical, cost and schedule progress on a large information systems program

• Present lessons learned from program experience for the benefit of other projects considering an EVMS.
An EVMS is a Continuous Process

Planning, Estimating &
Set-up

Collecting &
Analyzing

Reporting &
Reviewing

Corrective
Action

May 22, 1997
Each Phase Involves:

- Software Metrics
- Risk Assessments
- EVMS Data
WBS Top Level Views

“Program”
Level 0

1.0
Prog. Mgt.

2.0
HW & SW

3.0
Sys. Eng.

4.0
Release 1

5.0
Release 2

6.0
Release 3

7.0
Release 4

8.0
Release 5

“Release”
Level 1

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WBS Levels 2, 3 and 4 Views

```
  4.0
   ├── 4.1
   │    ├── 4.2.1
   │    │    ├── 4.2.2.1
   │    │    │    └── 4.2.2.2
   │    │    └── 4.2.2.x
   │    └── 4.2.2.2
   │         └── 4.2.2.x
   └── 4.2
        ├── 4.2.2
        │    └── 4.2.2.x
        └── 4.2.3
   └── 4.3
        └── 4.x
```

"Phase"
"Deliverable"
"Module"
WBS Levels 5 and below

4.2.2.2

4.2.2.2.1

4.2.2.2.2

4.2.2.2.2.1

4.2.2.2.2.2

4.2.2.2.2.2.1

4.2.2.2.2.2.2

4.2.2.2.2.2.3

4.2.2.2.2.3

4.2.2.2.2.x

4.2.2.2.x
Estimate Work

• Software design and development work - SLIM modeling tool
• Requirements Analysis, Systems Engineering, Testing and other work - historical data, experience, percentage of development, etc.
• Program Management - level of effort
• Hardware and Software procurement - catalog prices
• Travel - historical data and experience.
Prepare Detailed Schedule

- List all WBS activities
- Enter planned Start and End dates
- Establish duration of activities
- Link activities to reflect dependencies
- Review both Gantt and Pert chart formats
- Correct inconsistencies
What Else is Needed?

• A system to account for all direct and indirect costs on the project
• Job codes for all work activities
• Reporting period defined
• Detailed work packages
• A process to determine actual work completed during a reporting period
Release Work Packages

- Staffing Plan
- Budget
- Planned Hours
- Work Activities
Data Analysis

• Compare ACWP & BCWP to BCWS
  – Schedule Variance
  – Cost Variance
  – Schedule Performance Index (efficiency)
  – Cost Performance Index (efficiency)

• Compare EVMS data to Software Metrics

• Evaluate Performance to Past and Future Risks
Example Performance Data

The graph shows a comparison of ITD (Initial Time Delays) and CUM-BCWS, CUM-BCWP, and CUM-ACWP over the months of Sep-96 to Sep-97. The data points indicate the progression of costs and performance metrics over time, with visual lines representing the cumulative budget at completion (CUM-BCWS) and earned value (CUM-BCWP) compared to actual costs (CUM-ACWP).
Example Variance Data
Example Performance Indicies

SPI (e)
CPI (e)
Example Software Defect Metric

![Graph showing the trend of software defects found and fixed over time. The x-axis represents months from September to February, and the y-axis represents the number of defects. There are two lines: one in blue representing 'Found' defects, and one in pink with 'X' markers representing 'Fixed' defects. The graph shows an increasing trend in both found and fixed defects over time.]
Lessons Learned

• Develop a WBS structure early
• Detail work activities vs. business processes or organizational structures
• Modeling and automated tools are invaluable for evaluating alternatives
• Planning factors are often underestimated
  – Requirements, Complexity, Productivity, etc.
• Establish a historical database
• Prepare a detailed schedule with linked dependencies
Lessons Learned

• Setting up processes may consume more resources than actually using them
• Computer systems are not perfect - watch for errors and omissions
• Establish a “check and balance” process for all data
• Provide for back-up capabilities - the unexpected may happen
• Analysis takes time and requires an unbiased evaluator
Lessons Learned

- Software metrics are more subjective than financial information
- Determining work completion percentages can be very subjective
- Discrepancies between software metrics and financials will occur
- Not all actual costs will “hit the books” in time for reports
- Estimated actuals need to be adjusted every reporting period
Lessons Learned

• An EVMS requires time and dedicated people to be effective
• EVMS information provides a realistic “picture” of program performance
• Look at the trends vs. the absolute values
• An EVMS approach can be implemented for any program
• View an EVMS as a normal business practice for large projects
• You’ll learn to depend on EVMS information
Summary

• An EVMS:
  – Requires thorough planning
  – Facilitates baselines and control
  – Provides evidence of performance against a plan
  – Can be used all management levels
  – Can be used to manage risk
  – Requires discipline
  – Becomes a way of doing business