

# Earned Value Management (EVM)

**Systems Engineers get to share in the Cost Fun**



# Why Should You Care About Earned Value Management?

“...if you want to understand what is going on...then follow the money ”

**Famous Watergate Scandal Informant,  
Nixon Administration**



# What is Earned Value Management?

- **Earned Value Management (EVM)**
  - The use of an integrated management system that coordinates **work scope**, schedule, and cost goals and objectively measures progress toward these goals
  - EVM emphasizes the planning and integration of cost, schedule, and technical aspects of a program to support decisions by program managers
- **Use EVM to identify technical and/or schedule problem areas**
  - Identify problem areas early, minimize impacts
  - Provides Aerospace/SMC SPO personnel another dimension of insight into his/her area of responsibility
- **What it is not**
  - A leading edge predictor of performance
  - A risk management system



# Systems Engineering Role

- **Ensure the “Work Scope” is adequately defined**
  - Tie from the System Requirements to the Work Breakdown Structure (WBS), to the Integrated Management Plan (IMP), Integrated Management Schedule (IMS) and EVM system
- **Ensure the EVM system is grounded with an appropriate “work scope”**
  - Contractor “control account” managers either are the engineering staff or coordinate closely with their engineering staff
  - Discussions with “control account” managers are productive
  - This should happen at, or before, Integrated Baseline Review (IBR)
- **Use the EVM system as another management tool**
  - Detect trends, act when necessary
  - Use as part of feedback (e.g., award fee)



# EVM Systems Engineering Role

- **SAF/AQ has authority and responsibility for EVM within the Air Force**
- **AF program office reports up program management chain (i.e., SAF/AQ chain)**
- **Systems engineer role**
  - Must understand cost/schedule in addition to technical performance
  - Should participate in the Earned Value Implementation Review or Integrated Baseline Review
- **Integrated Baseline Review**
  - Formalizes contractor EVM procedures
  - Identifies program/contract risk through interview process



# EVM Systems Engineering Role

## Practical Benefits

- **EVM provides second and third dimensions of insight (technical being first) into contractor development, build/integration, test, etc. activities**
  - Format 5 is especially informative
- **Provides insight into contractor motivation and can sometimes explain a seemingly non-logical and/or sub-optimal contractor position on a technical issue**
- **Makes the systems engineer a more informed acquisition team member**
  - Better able to provide balanced recommendations/decisions
  - Less likely to propose a “dead on arrival” technically superior yet (too) costly solution



# Contractor Reports

- **Cost Performance Report (CPR)**

current and cum data

- **Format 1:** Cost and schedule progress by **WBS**
  - (specified reporting level usually at WBS level 3: Exception - high risk elements)
- **Format 2:** Cost and schedule progress by **functional organization**
- **Format 3:** Changes to performance measurement baseline
- **Format 4:** Manpower forecast
- **Format 5:** Explanations and Problem Analyses



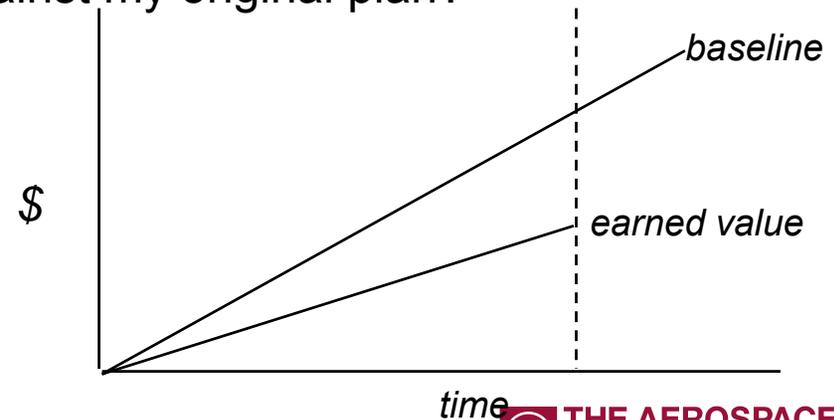
# What Do We Measure Progress Against?

- **Performance Measurement Baseline (PMB)**

- budget that is spread over . . .
- time, to accomplish the scope of
- work
- and against which progress can be measured

- **Earned Value is key concept**

- how much progress did I make against my original plan?
- expressed in dollars or hours

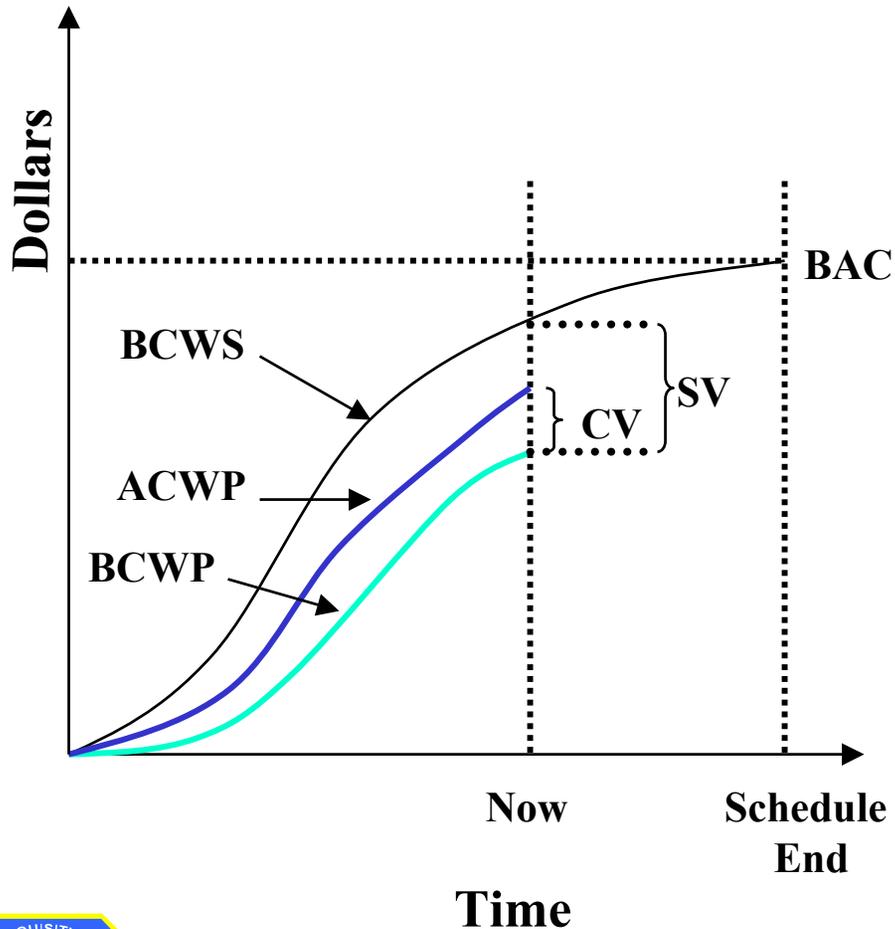


# Five Basic Performance Data Questions & Answers

<b>QUESTION</b>	<b>ANSWER</b>	<b>ACRONYM</b>
How much work <u>should</u> be done?	Budgeted Cost of Work Scheduled	BCWS
How much work <u>is</u> done?	Budgeted Cost of Work Performed	BCWP
How much did the <u>performed</u> work cost?	Actual Cost of Work Performed	ACWP
What was the total job <u>supposed</u> to cost?	Budget at Completion	BAC
What do we <u>now expect</u> the total job to cost?	Estimate at Completion	EAC



# Working Against the Plan



- As Work Is Performed, Earned Value Is Claimed and Actual Dollars Are Expended
  - earned value = budgeted cost of work performed (BCWP)
  - actual cost = actual cost of work performed (ACWP)
- Cost Variance (CV)
  - $CV = BCWP - ACWP$
- Schedule Variance (SV)
  - $SV = BCWP - BCWS$
  - units of dollars, NOT time!
  - *INDICATOR* of being “on plan”
- Percent Complete, Percent Spent
  - % complete =  $BCWP / BAC$
  - % spent =  $ACWP / BAC$



# Possible Outcomes if a Program is Having Cost/Schedule Problems

- **Revisions to the PMB Baseline**

- Formal Contract Changes
- Internal Replanning
  - Contractor replans within confines of overall budget & schedule
  - Apply Management Reserve (*a problem indicator*)
- Formal Replanning/Reprogramming
  - **Over Target Baseline (OTB)**
    - Formal declaration of an overrun
    - Contractor seeks approval to manage to a goal other than the contract target



*If your program is discussing an OTB, your program is in trouble*



# EVM Take Away

## You should now be familiar with

- **What EVM “Is” and “Is not”**
- **Why EVM is important to Systems Engineers and Program Success**
- **The basic EVM terms & concepts**
- **The limitations of EVM**
- **Understand how EVM is “done”**
  - Role of SMC team members
  - Checklists, tips, learning resources, etc.



# Educational Opportunities & Resources

- **References**

DOD Handbook 881 – Work Breakdown Structure (2 Jan 1998)

NDIA Program Managers Guide to the Review of an Integrated Baseline (Dec 2001)

Earned Value Management: Overview, Gayek and Rudy, Systems Architecture and Engineering Dept., Reconnaissance Systems Div., The Aerospace Corporation, Chantilly, VA

Earned Value: The SAF/AQ Perspective, Mr. Blaise Durante, Deputy Asst. Secretary of the AF for Management Policy & Program Integration

Basic Earned Value Management for Program Managers, Eleanor Haupt, ASC/FMCE

- **Training**

### DAU/DSMC Courses

- Intermediate Systems Acquisition (ACQ 201)
- Fundamentals of Earned Value Management (BCF 102)
- Intermediate Earned Value Management (BCF 203)

### Aerospace Institute Course

- Earned Value Management (S4340)

- **Resource**

EVM Home Page – <http://www.acq.osd.mil/pm>

