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# Earned Value Management and the Government Program Office

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**Blair Alan Knapp Jr. MSPM PMP**

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# Agenda

- **EVM Information**
- **Alignment – OMB Exhibit 300 and Funding**
  - Government Program Office Challenges
  - Government Program Office Support Team
- **A Word on IBRs**
- **A Word on Progress Reporting**
- **Graphically Rendering “Efficiency”**
  - What it Means to the Customer
  
- **And if we have time, A Primer on “Work”**

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# EVM Information

# What is Earned Value?

## Earned Value (EV)

- method for translating Scope, Schedule and Budget into quantifiable measurement of a program's progress
- [It is] what you physically got for what you actually spent
- the efficiency of the work accomplished
- the measured performance <sup>1</sup>

## Earned Value Management (EVM)

- oversight and coordination necessary to implement, maintain an EVMS, and report out EV

## Earned Value Management System (EVMS)

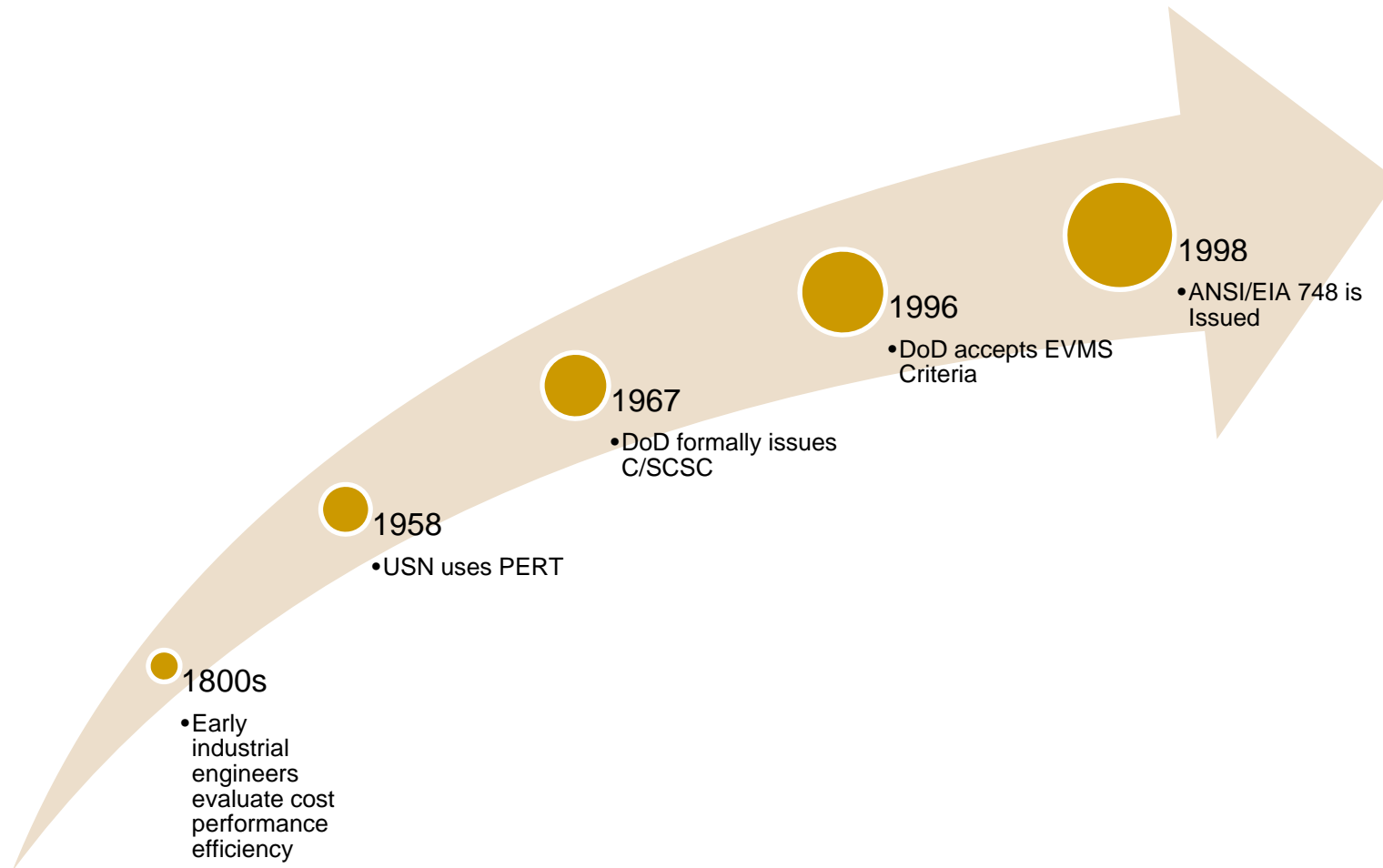
- integration of tools and processes that satisfy the American National Standards Institute/Electronic Industry Alliance (ANSI/EIA) 32 criteria
- these criteria outline the minimum management control guidelines for an EVMS

## Earned Value Management

- also referred to as **Performance-Based Management**

<sup>1</sup> Fleming, Koppelman, Earned Value Project Management, Second Edition, 2000

# Evolution of Earned Value Management



**Although it has Evolved Over the Last Several Decades, EVM is not a New Concept**

# Who Uses Earned Value?

## **The Program Manager (PM) is responsible for implementing EVM**

- During solicitation, the PM collaborates with the Contracting Officer (CO), and using the agency/program EVM guide, ensures the appropriate clauses are included in the solicitation and contract
- Upon contract award, the PM assesses contractor's proposed EVMS and is authority for evaluating and approving EV-related deliverables

## **The Contracting Officer (CO) is responsible for coordinating EVM requirements with the PM**

- Coordinates prior to contract award and final agreement with contractor on system/processes that will be used to track and report performance
- Ensures EV-related language is incorporated into the contract
- Complexity of the reporting process imposed should be based on the parameters (cost, schedule and technical risk) identified in agency/program EVM Guide and contractor's existing reporting system

# Why Use Earned Value Management?

## Government PM

- **Responsibility is** to protect the Government's interests by monitoring and managing contract performance

## Prime Contractor

- **Responsibility is** to provide the Government actionable information regarding contract performance

## Earned Value Management

- Supports these responsibilities by:
  - Ensuring a clear definition of program scope
  - Providing an objective measure of contractor accomplishment
  - Ensuring the government has accurate, objective, and real time contract status
  - Supporting risk based analysis by early identification of trends and potential risks
  - Supporting the mutual goals of contractor and government by bringing in programs on schedule and within cost

# What Guidance Influences Earned Value?

## OMB Circular A-11

- OMB mandate that federal agencies implement performance measures and performance management processes based on EVM guiding principles. These processes are required not only for the government, but also required of its contractors (June 2003)

## ANSI/EIA 748B Standard for Earned Value Management Systems

- Industry re-write of the original 35 Cost/Schedule Control Systems Criteria (C/SCSC) (July 1998)

## FAR EVM Clause 34.202(a)

- Provides EV requirements and must be included in contracts, as applicable

## AMS EVM Clause 1.13-2

- Provides EV requirements and must be included in contracts, as applicable

## Department and Agency-specific EVMS Management Directives

## PMI PMBOK – Naturally!

# Data Requirements – Applicable DIDs

## DID DI-MGMT-81466A

- Contract Performance Report (CPR) (Data Item Description (DID) number **DID DI-MGMT-81466A**)

## DID number DI-MGMT-81650

- Integrated Master Schedule (IMS) (**DID number DI-MGMT-81650**) are required whenever EVM is required (contracts equal to or greater than \$20M)

## DID number DI-MGMT-81334B

- Product-oriented Contract Work Breakdown Structure (CWBS) in accordance with the DoD WBS Handbook (MIL-HDBK-881A) and the CWBS DID (**DID number DI-MGMT-81334B**)

## DID number DI-MGMT-81468

- Contract Funds Status Report (CFSR) (**DID number DI-MGMT-81468**) is required. No specific dollar thresholds are established for the CFSR, but application to contracts of less than \$1.5M should be carefully evaluated.

**For Data Item Descriptions (DIDs), Please Refer to [www.acq.osd.mil/pm/](http://www.acq.osd.mil/pm/)**

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## EVM Heuristics

Earned Value Management System (EVMS) in compliance with ANSI/EIA-748B is required on all cost or incentive contracts equal to or greater than \$20M.

A formally validated and accepted EVMS is required for cost or incentive contracts equal to or greater than \$50M.

EVM is discouraged for Firm-Fixed Price (FFP) contracts. Exception requires business case and Milestone Decision Authority waiver.

EVM may be imposed on contracts less than \$20M as a risk-based decision of the program manager based on a cost/benefit analysis.

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# EVM and DCMA

## Defense Contract Management Agency (DCMA)

- Memorandum of Agreement (MOA) with DHS for EVM Services

## DCMA offers the following services on a reimbursable basis

- Initial EVMS compliance reviews and acceptance determinations
- Surveillance reviews of ongoing compliance with the EVMS ANSI standard
- Review for cause evaluations
- Subject Matter Expertise

## DCMA IBR Tripwires

- DCMA has worked closely with the Office of the Under Secretary of Defense, Acquisition and Technology OUSD (A&T) to develop EVM primary and secondary “tripwires” and common performance metrics and thresholds that provide unbiased insights into program cost, schedule, and/or performance issues. These “tripwires” standardize Defense Acquisition Executive Summary (DAES) Reporting.

# EVM and the PMBOK

## Integration Management

- 4.1.1.4 – Account for Process Assets
- 4.5.1.3 – Earned Value Technique

## Time Management

- 6.6.2.1 – Progress Reporting

## Cost Management

- 7.0 – [EV Rules, Reporting Formats, and Process Descriptions]
- 7.2.2.2 – Reserve Analysis
- 7.3.2.2 – Performance Measurement Analysis [Formulas]

## Communications Management

- 10.3.3 – Performance Reporting [Reports, Forecasts, Changes, Corrective Actions, Updates]

## Risk Management

- 11.6.2.3 – Variance and Trend Analysis

# Earned Value Courses and Websites

Course or Website	Description or Link
Project Management Institute	<a href="http://www.pmi.org">www.pmi.org</a> [drill down for PMBOK]
OMB Circular A-11	<a href="http://www.whitehouse.gov/omb/circulars/a11/current_year/a11_toc.html">www.whitehouse.gov/omb/circulars/a11/current_year/a11_toc.html</a>
ANSI/EIA-748B	<a href="http://www.ansi.org">www.ansi.org</a> [drill down to online store]
Defense Contract Management Agency	<a href="http://www.dcm.mil">www.dcm.mil</a> [drill down for “tripwires”]
DoD EV Website	<a href="http://www.acq.osd.mil/pm">www.acq.osd.mil/pm</a> [explore!]
NDIA Website	<a href="http://www.ndia.org">www.ndia.org</a> [explore!]
Mil Std 881A	Combatindex.com/mil_docs/std/0800/MIL-STD-88A.pdf
BCF 102 (on-line), Fundamentals of EV	<a href="http://www.dau.mil/">www.dau.mil/</a> [drill down to specific course]
BCF 203, Intermediate EV	<a href="http://www.dau.mil/">www.dau.mil/</a> [drill down to specific course]
CLM 013, Work Breakdown Structure	<a href="http://www.dau.mil/">www.dau.mil/</a> [drill down to specific course]
Contract Performance Report (CPR)	<a href="http://www.acq.osd.mil/pm/">www.acq.osd.mil/pm/</a> [scroll down for link]
Integrated Master Schedule (IMS)	<a href="http://www.acq.osd.mil/pm/">www.acq.osd.mil/pm/</a> [scroll down for link]
Product-oriented Contract Work Breakdown Structure (CWBS)	<a href="http://www.acq.osd.mil/pm/">www.acq.osd.mil/pm/</a> [scroll down for link]
Contract Funds Status Report (CFSR)	<a href="http://www.acq.osd.mil/pm/">www.acq.osd.mil/pm/</a> [scroll down for link]

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Alignment  
OMB Exhibit 300 and Funding

# OMB Exhibit 300 A-11, Part 7

## Planning, Budgeting, Acquisition, and Management of Capital Assets

### Part I – Summary Information and Justification

- Section A: Overview
- Section B: Spending
- Section C: Acquisition/Contract Strategy
- Section D: Performance Information
- Section E: Security and Privacy
- Section F: Enterprise Architecture

### Part II – Planning, Acquisition, and Performance

- Section A: Alternatives Analysis
- Section B: Risk Management
- Section C: Cost and Schedule Performance

### Part III – Operations and Maintenance

- Section A: Risk Management
- Section B: Cost and Schedule Performance

### Part IV – Planning for Multi-agency Collaboration

- Section A: Multi-Agency Collaboration Oversight
- Section B: Risk Management
- Section C: Cost and Schedule Performance

**For OMB Exhibit 300 Information, Please Refer to  
[www.whitehouse.gov/omb/circulars/a11/current\\_year/a11\\_toc.html](http://www.whitehouse.gov/omb/circulars/a11/current_year/a11_toc.html)**

## Alignment – OMB Exhibit 300 and Funding

**DME** (Development,  
Modernization,  
Enhancement)

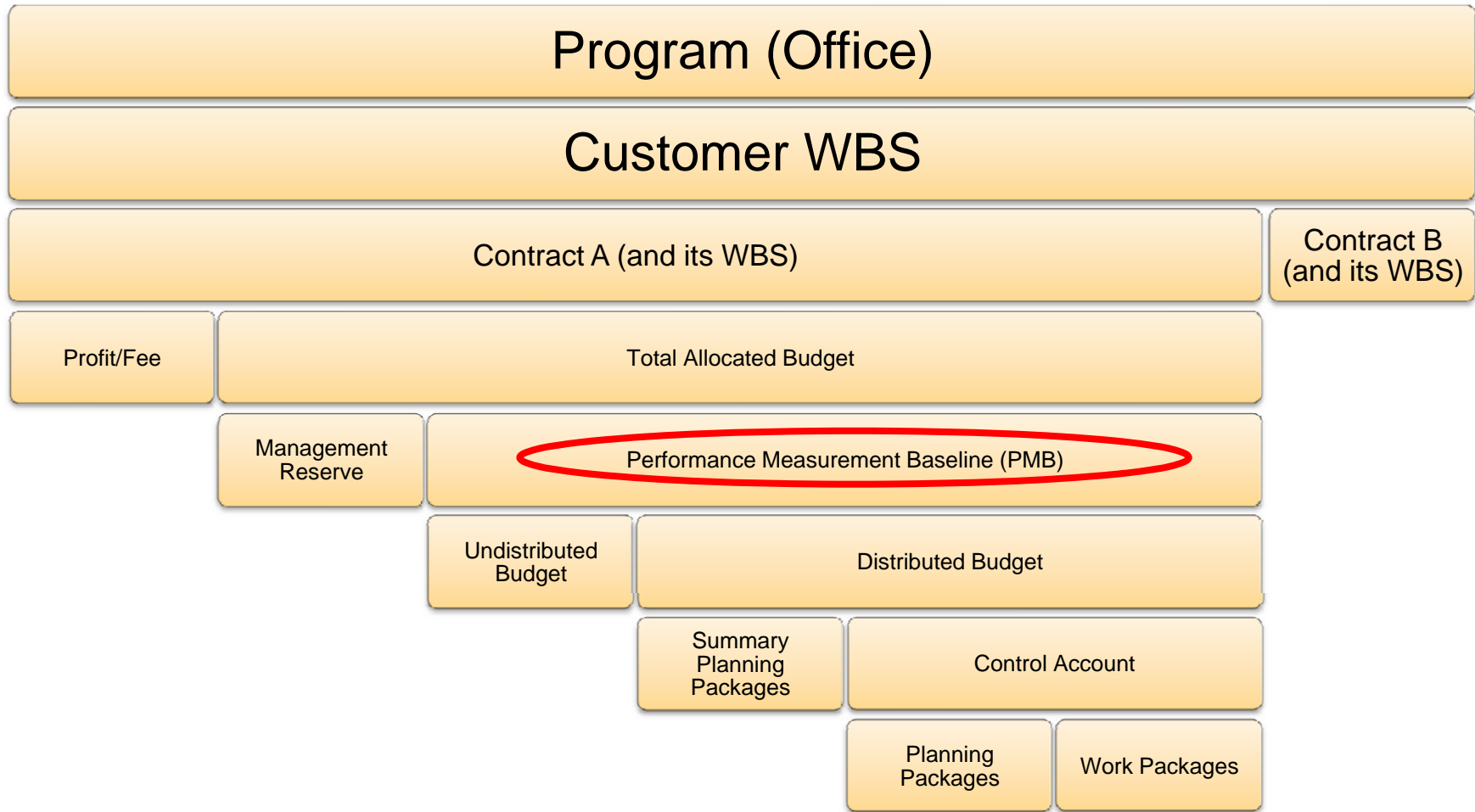
- **“Earned Value”**
  - Cost
  - Schedule

**O&M** (Operations  
and Maintenance)

- **Operational Analysis**
  - Annual Estimates
  - Annual Assessments

**Government PO has Unique Challenges Not Shared With the Prime Contractor**

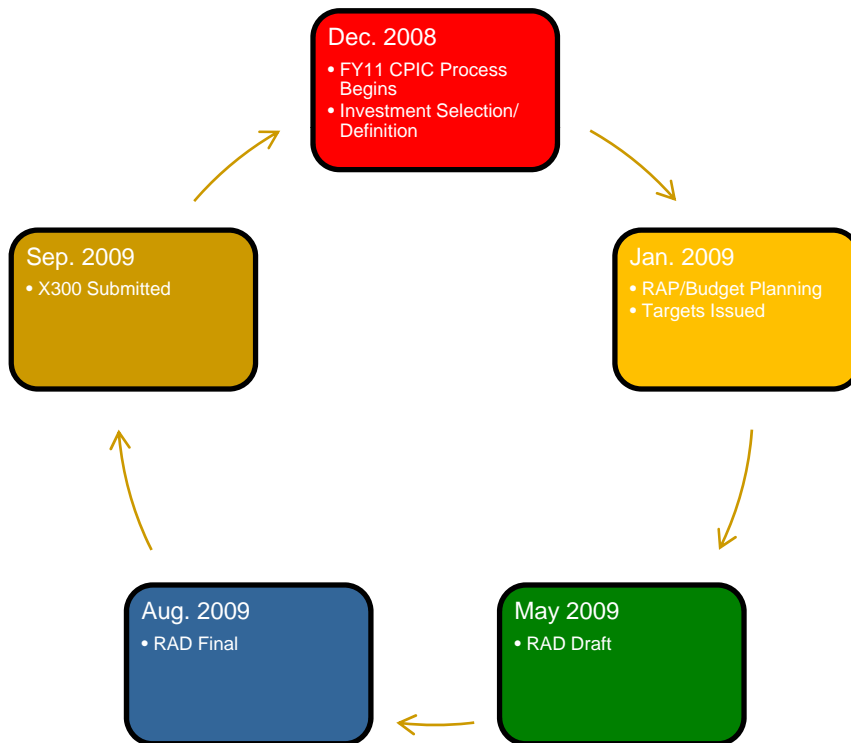
# The Program Office and the PMB



**EV Focus is on the Performance Measurement Baseline On Down**

# OMB Exhibit 300 Milestones and Decomposition

## Annual Cycles

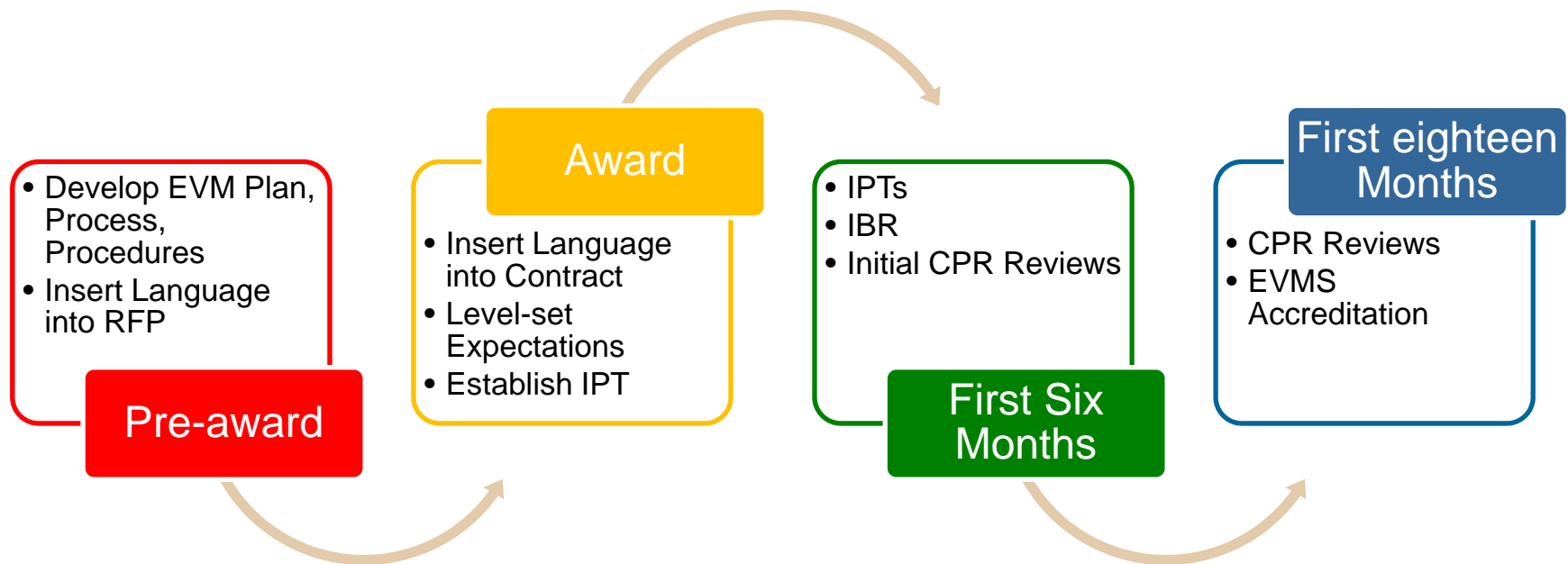


## Alignment

- **Define**
  - Define
    - Define
  
- **Your:**
  - Scope
  - Schedule
  - Budget
  
- **Anticipate Phase Transitions**
  - DME to O&M to Mixed L/C

**Program Office Support Varies, but is Consistent Throughout the Year**

# EVMS Milestones to Consider



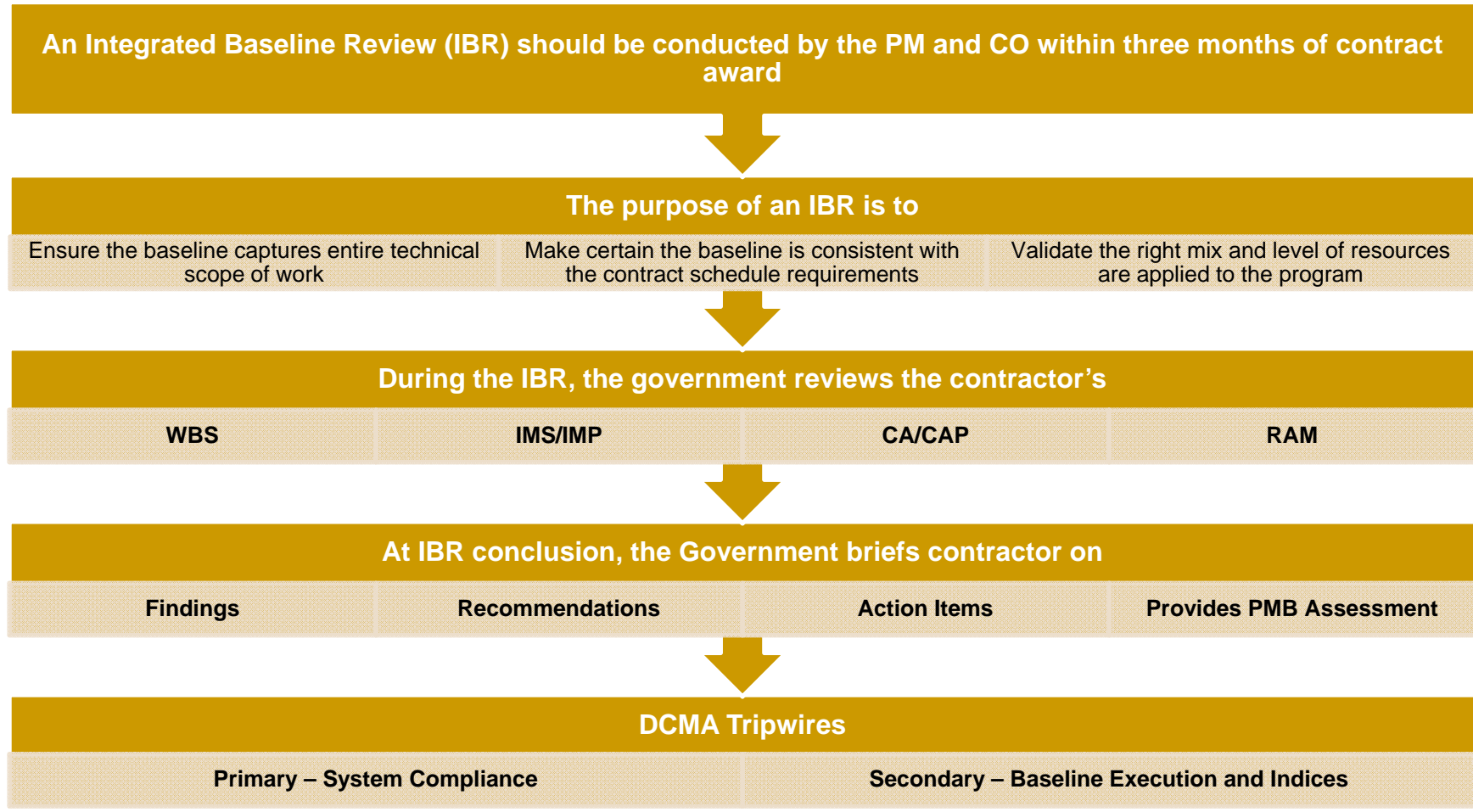
**Add Value by Engaging with the Contractor Early and Often**

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# A Word on IBRs

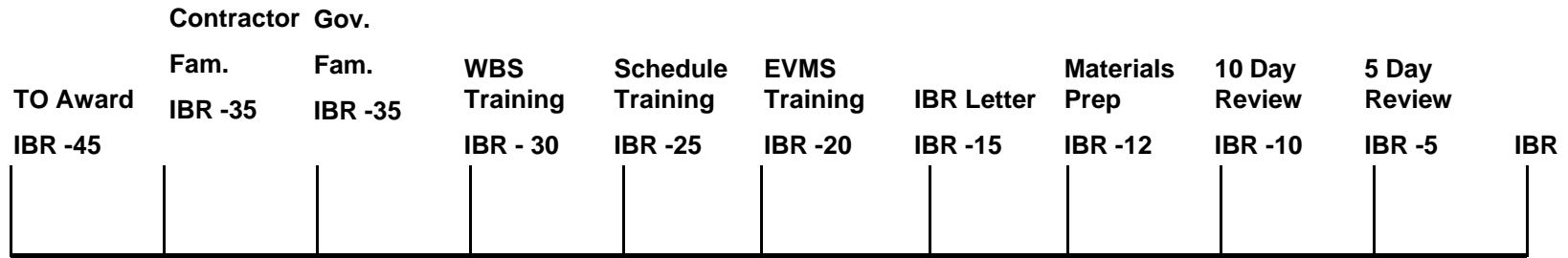
## (Conducting the Integrated Baseline Review)

# Integrated Baseline Review

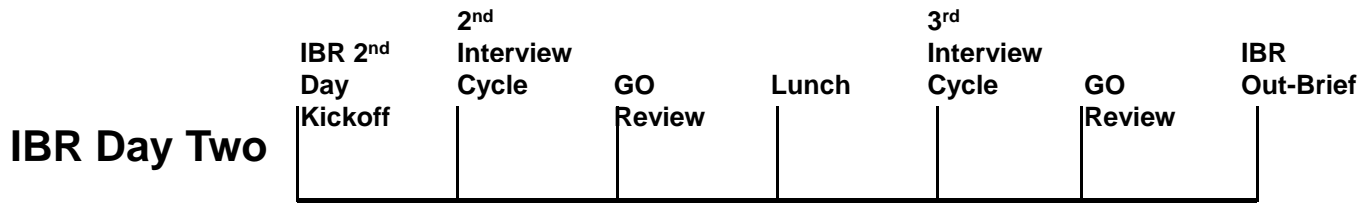
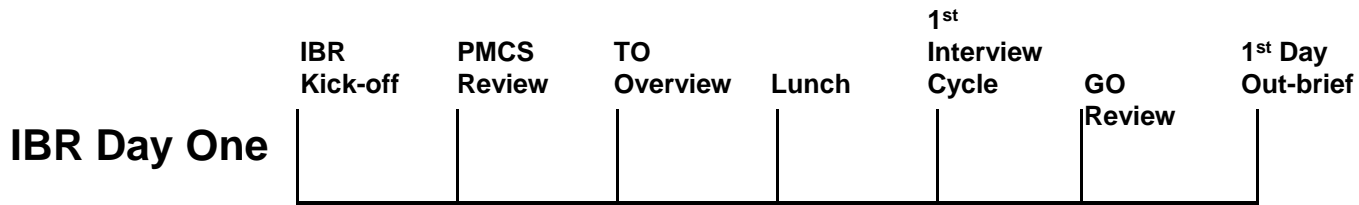


**Through the IBR, the Government Verifies and Validates the PMB**

# Notional IBR Timeline



## Pre-IBR



## IBR

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# *A Word on Progress Reporting*

## *(Reading the CPR, Conducting the CPR)*

# Contract Performance Reporting

## Contract Performance Reports (CPRs)

- most comprehensive and detailed of standardized Earned Value reporting

## CPRs provide

- contract status and are contractually required by the Department

## The data analyzed

- derived from the contractor's approved Earned Value Management System

## The Contract Performance Report (CPR)

- contractor-generated report that provides program/contract status

**Get CPR Early, Review Data Rigorously, Brief Government POC Immediately**

# Contract Performance Report Reviews

## Contract Performance Report Reviews, or CPR Reviews, Are

Standard, generally monthly, meetings at which program performance is reviewed.



## Information Reviewed

Program Performance

Risk

Estimate at Completion

Variations and their explanations

Scope



## Participants Generally Are

Government PM

Contractor PM

CAMs

EV Subject Matter Experts

Relevant Stakeholders

**Incorporate CPR Reviews into Comprehensive Program Management Reviews**

# The Contract Performance Report

## Format 1: WBS View

- Identifies both current and cumulative variances
- Information usually reported at WBS level 3 or 4 (lower if known risk area)

## Format 2: OBS View

- Organized by organizational element
- Contractor may use this report to evaluate departmental performance

## Format 3: Baseline View

- Details all changes to the Performance Management Baseline on a monthly basis

## Format 4: Staffing View

- Focuses on current and future staffing levels and requirements; excludes cost data

## Format 5: Variances View

- Narrative summary of problems (from all other formats) that includes reason for variance, problem impact, and recovery plan

**Formats 1 and 5 are Popular; Why Is Format 4 Worth a Look?**

# The CPR Formats

**Headers Largely The Same**

**1**

**2**

**3**

**4**

**5**

**Bodies Contain Unique Data**

The diagram illustrates five overlapping Cost Performance Report (CPR) forms, labeled 1 through 5. Red arrows indicate that the headers of forms 1, 2, and 3 are largely the same, while the bodies of forms 1, 2, 3, and 5 contain unique data. The forms are structured as follows:

- Form 1:** COST PERFORMANCE REPORT - WORK BREAKDOWN STRUCTURE. Includes sections for CONTRACT DATA, MANAGEMENT EST, CONTRACT BUDGET, and PERFORMANCE DATA (WBS ITEM).
- Form 2:** COST PERFORMANCE REPORT - ORGANIZATIONAL CATEGORIES. Includes sections for CONTRACT DATA, ORGANIZATIONAL CATEGORY, and PERFORMANCE DATA.
- Form 3:** COST PERFORMANCE REPORT - BASELINE. Includes sections for CONTRACT DATA, CONTRACT START DATE, PERFORMANCE DATA (PVS), and BASELINE CHANGES.
- Form 4:** COST PERFORMANCE REPORT - STAFFING. Includes sections for CONTRACT DATA, CONTRACT START DATE, PERFORMANCE DATA (PVS), and STAFFING.
- Form 5:** COST PERFORMANCE REPORT - EXPLANATIONS AND PROBLEM ANALYSES. Includes sections for CONTRACT DATA, CONTRACT START DATE, PERFORMANCE DATA (PVS), and EVALUATION.

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# Graphically Rendering “Efficiency”

# Terminology Summary

Term	Definition	Formula
<b>AC</b>	Actual Cost (ACWP): Costs incurred and recorded in accomplishing work performed within a given time period.	
<b>BAC</b>	Budget at Complete: The sum of all budgets established for the contract.	
<b>CPI</b>	Cost Performance Index: The dollar value of work accomplished for each dollar spent.	EV/AC
<b>CV</b>	Cost Variance: Indicates how much over or under budget the project is.	EV – AC
<b>EAC</b>	Estimate at Complete: Actual direct costs, plus indirect costs allocable to the contract, plus the estimate of costs (direct and indirect) for authorized work remaining.	
<b>ETC</b>	Estimate to Complete: Portion of EAC that addresses total expected costs for all work remaining on the contract.	
<b>EV</b>	Earned Value (BCWP): The sum of the budgets for completed work packages and completed portions of open work packages, plus the applicable portion of the budgets for level of effort and apportioned effort.	
<b>PV</b>	Planned Value (BCWS): The sum of the budgets for all work packages, planning packages, etc., scheduled to be accomplished (including in-process work packages), plus the amount of level of effort and apportioned effort scheduled to be accomplished within a given time period.	
<b>SPI</b>	Schedule Performance Index: The dollar value of work accomplished for each dollar of work planned	EV/PV
<b>SV</b>	Schedule Variance: Indicates how much ahead or behind schedule the project is.	EV – PV
<b>TCPI</b>	To Complete Performance Index: The cost efficiency that must be achieved in remaining period of performance to complete the total work scope within the BAC target.	
<b>VAC</b>	Variance at Complete: Difference between total budget assigned to a contract, WBS element, Organizational entity or cost account and the estimate at completion. It represents the amount of expected overrun or underrun.	BAC – EAC

**For a Complete List, go to [www.acq.osd.mil/pm/faqs/glossary.htm](http://www.acq.osd.mil/pm/faqs/glossary.htm)**

# Estimate at Completion (EAC)

Codify the EACs you will use for Best, Worst, and Most Likely Outcomes

Method	CPI-based	Mathematical	Cumulative EAC	EV-based
Formula	$BAC/CPI$	$ACWP + BAC - BCWP$	$[(BAC - BCWP)/(SPI * CPI)] + ACWP$	$ACWP + (BAC - BCWP)/CPI$
Interpretation	Used if no variances from the BAC have occurred or you will continue at the same rate of spending.	Used when current variances are thought to be <i>atypical</i> of the future.	Used when considering both cost and schedule impacts on EAC	Used when current variances are thought to be <i>typical</i> of the future.

**Early and Careful Monitoring of EAC is Integral to Program Success**

# Understanding Cost and Schedule Variances

## The Program Office Wants to Know

- “Will the contract finish on time?”
- “Will the contract require additional funding?”

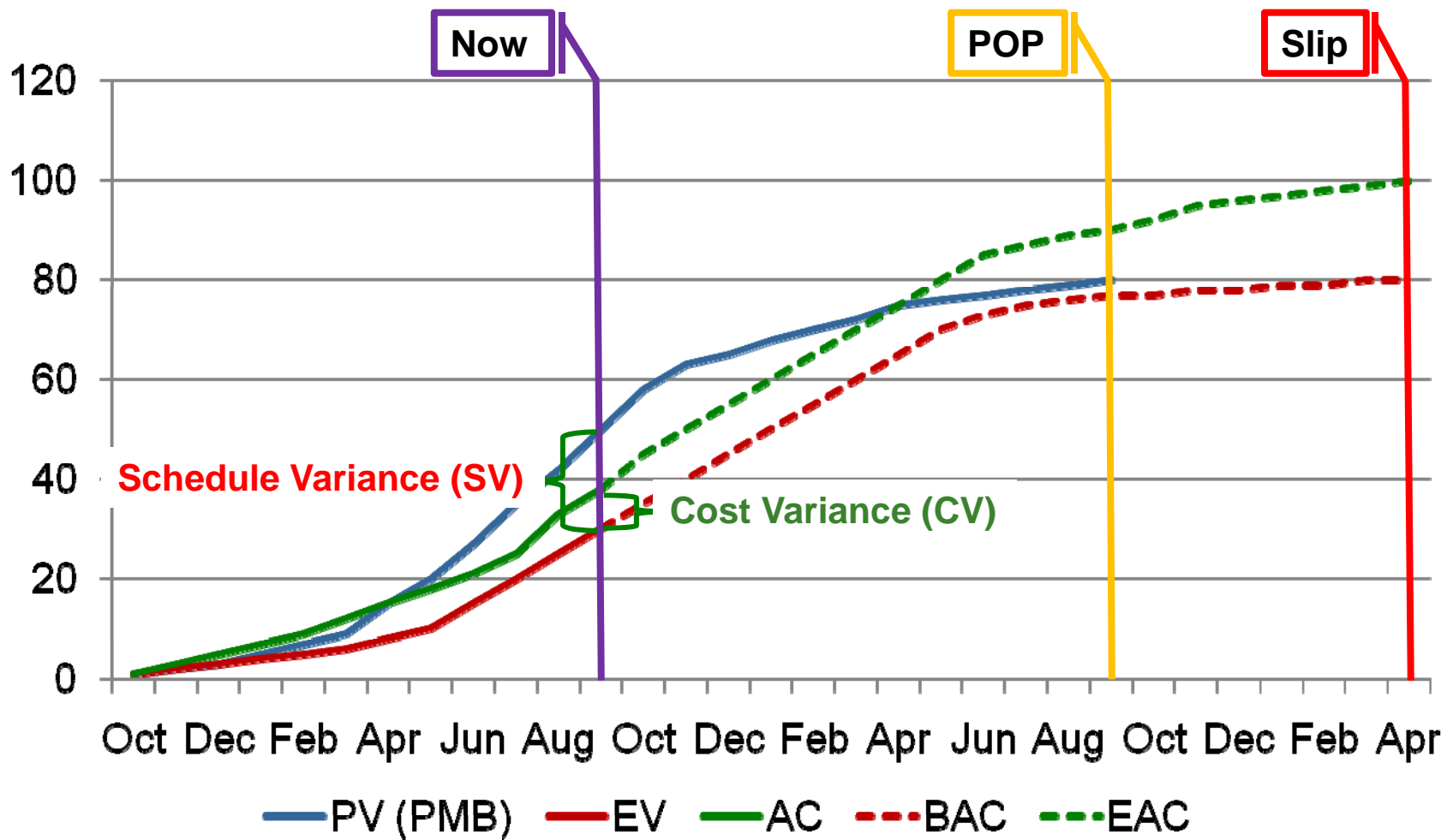
## Cost Variance (CV)

- $EV - AC$ , or  $BCWP - ACWP$

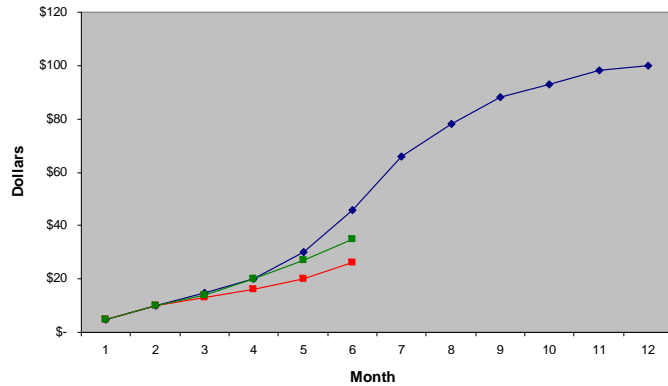
## Schedule Variance

- $EV - PV$ , or  $BCWP - BCWS$

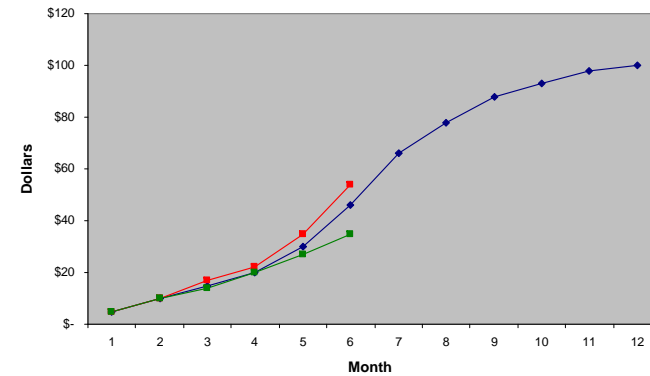
# Understanding Cost and Schedule Variances



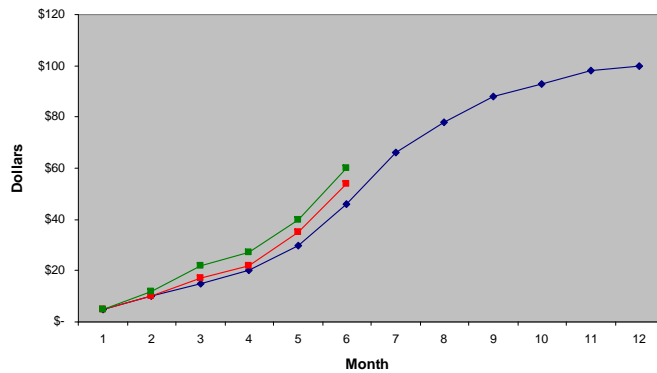
# Understanding Cost and Schedule Variance



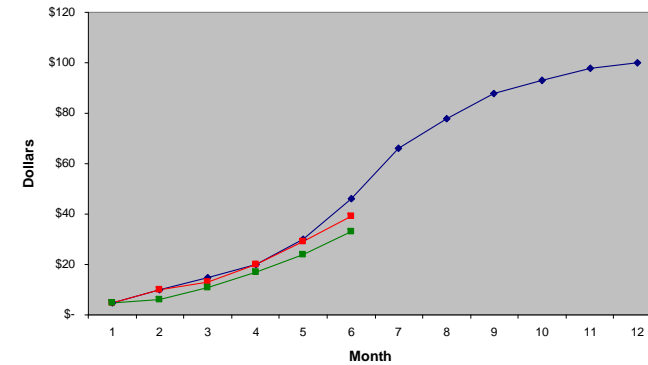
$SV = BCWP - BCWS$  \$ (20) Behind Schedule  
 $CV = BCWP - ACWP$  \$ (9) Negative Cost Variance



$SV = BCWP - BCWS$  \$ 8 Ahead of Schedule  
 $CV = BCWP - ACWP$  \$ 19 Positive Cost Variance



$SV = BCWP - BCWS$  \$ 8 Ahead of Schedule  
 $CV = BCWP - ACWP$  \$ (6) Negative Cost Variance



$SV = BCWP - BCWS$  \$ (7) Behind Schedule  
 $CV = BCWP - ACWP$  \$ 6 Positive Cost Variance

# Understanding Cost and Schedule Indices

## The Program Office Wants to Know

- “How Efficiently is Contractor Executing Contract/TOs?”
- “What Must Change to improve efficiency?”

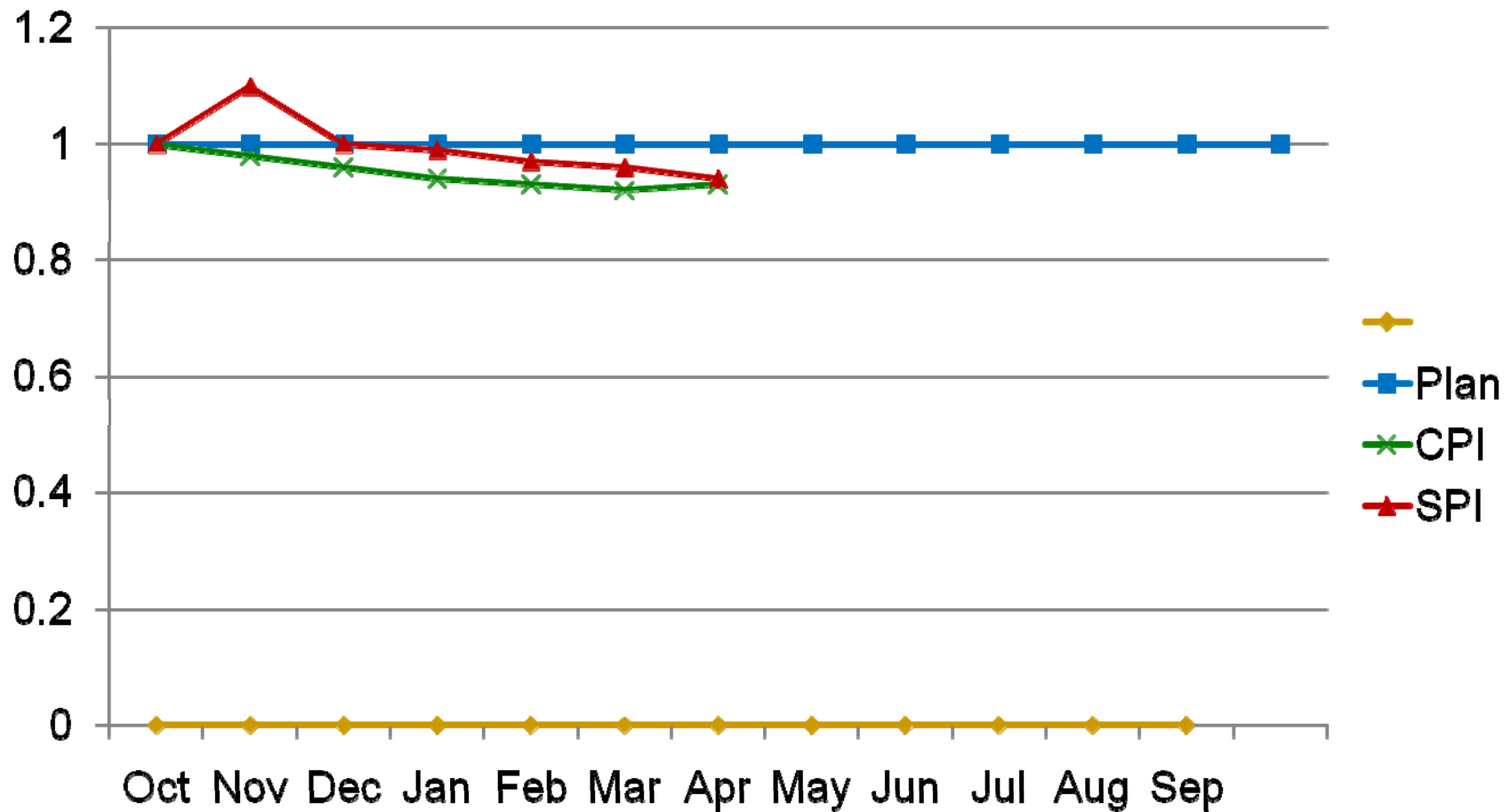
## Cost Performance Index (CPI)

- $EV/AC$ , or  $BCWP/ACWP$

## Schedule Performance Index (SPI)

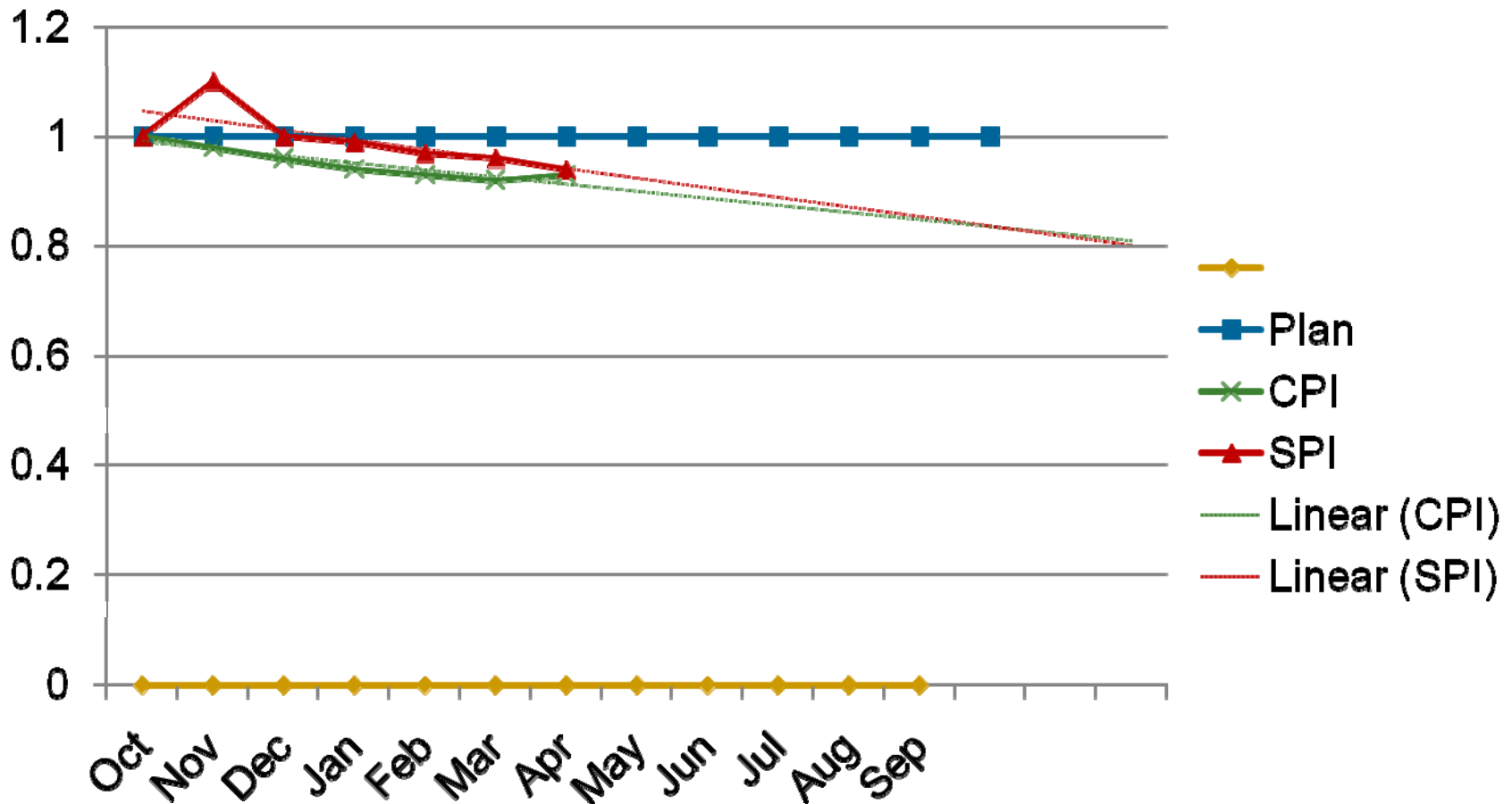
- $EV/PV$ , or  $BCWP/BCWS$

# Understanding Cost and Schedule Indices



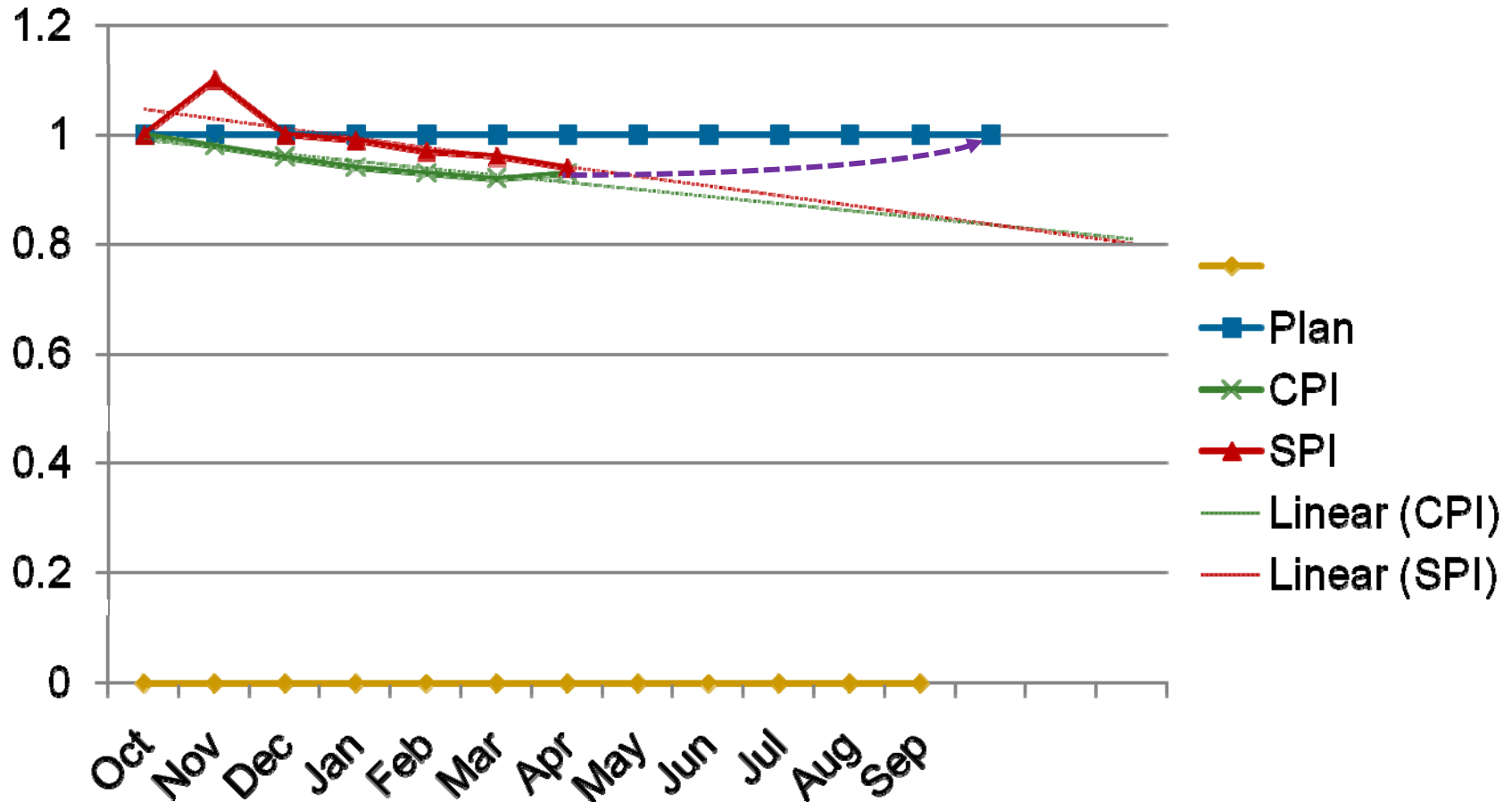
Actuals Indicate Contract is Inefficient

# Understanding Cost and Schedule Indices



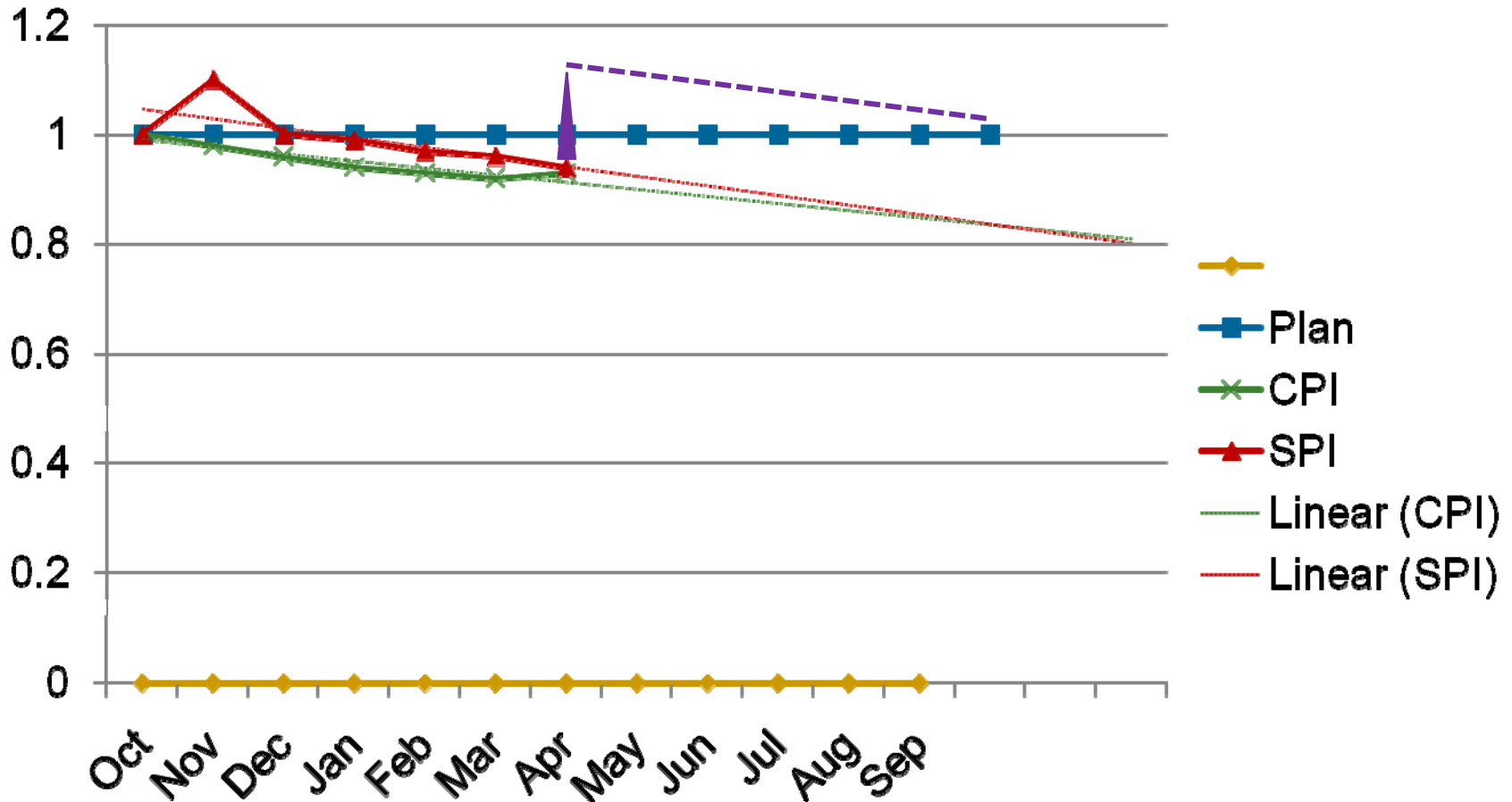
Trend Lines Suggest this will Continue

# Understanding Cost and Schedule Indices



Can Get Back on Track By Becoming More Efficient, or ...

# Understanding Cost and Schedule Indices



Can Get Back on Track By Infusing Cash (Rebaselining)

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# A Primer on Work (Back up Slides)

# Work Breakdown Structure

The WBS is a grouping of project elements that organizes and defines the total work scope of the project.

It is displayed graphically (depicted below) or as a listing as shown on the right

## Work Breakdown Structure (WBS)

### 1.0 System

#### 1.1 Hardware

- 1.1.1 Passenger Screening
- 1.1.2 Baggage Screening

#### 1.2 Software

- 1.2.1 System Management
- 1.2.2 External Interfaces

#### 1.3 Program Management/System Engineering

- 1.3.1 Program Management
- 1.3.2 System Engineering

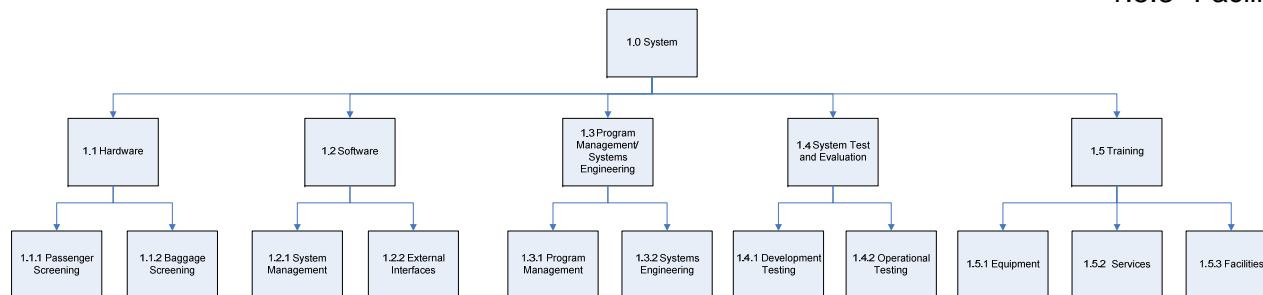
#### 1.4 System Test and Evaluation

- 1.4.1 Development Testing
- 1.4.2 Operational Testing

#### 1.5 Training

- 1.5.1 Equipment
- 1.5.2 Services
- 1.5.3 Facilities

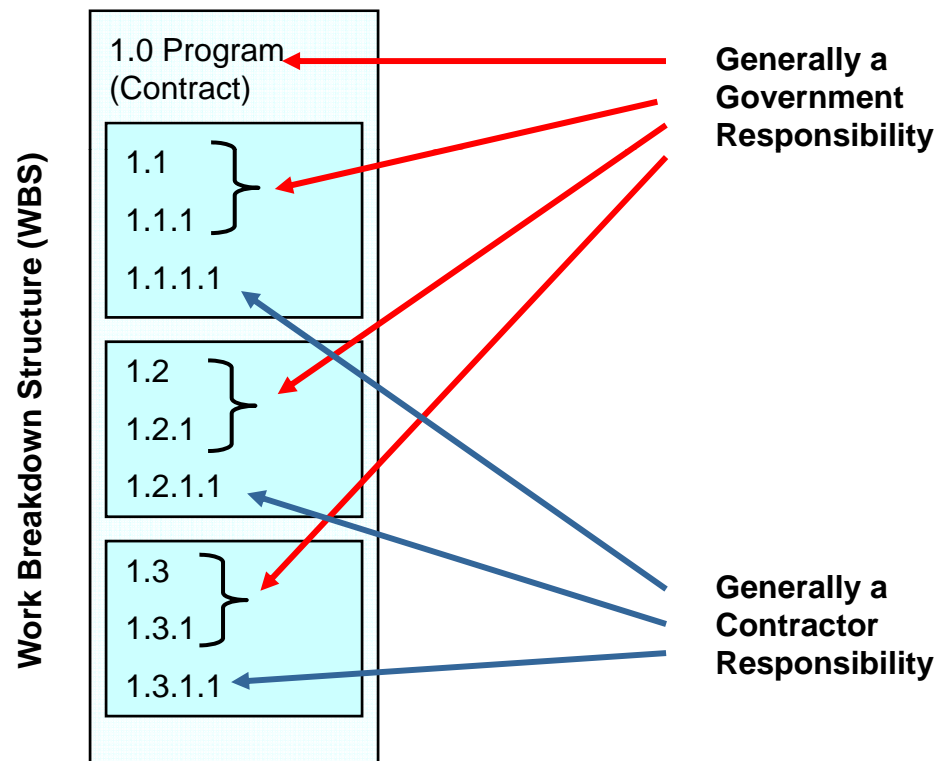
## Work Breakdown Structure (WBS)



# Work Breakdown Structure

The Work Breakdown Schedule (WBS) project elements may be a product, data, or a service

- Identify the scope of work through development of a comprehensive WBS
- Plan the work to the control account & work package levels (Contractor)



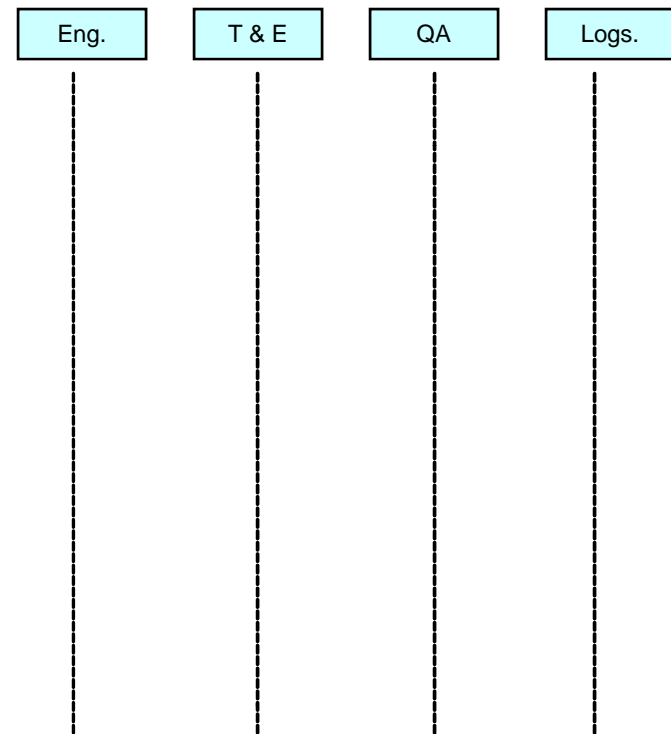
The WBS serves as the basis for the schedule and EV

# Organizational Breakdown Structure

The Organizational Breakdown Structure (OBS) delineates functional lines of reporting and responsibility

- Once the WBS is developed, the appropriate resources and responsibilities need to be assigned to each work package. The first step in doing this is developing the OBS
- The OBS depicts the reporting structure, routes of authority and responsibility for the management of the program

Organizational Breakdown Structure (OBS)

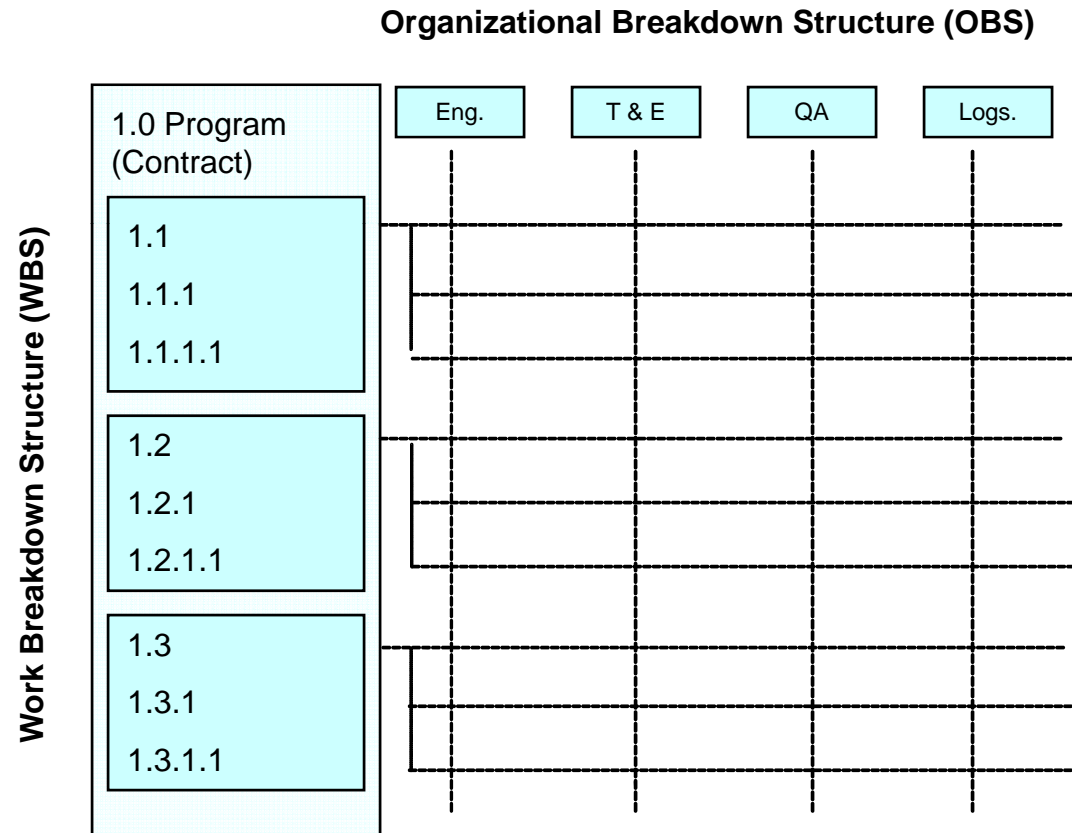


The OBS relates work to organizations

# Responsibility Assignment Matrix

The Responsibility Assignment Matrix (RAM) is a depiction of the relationship between the WBS elements and the organizations assigned responsibility for ensuring their accomplishment

- Within the program's WBS and the OBS, the RAM integrates contract
  - Planning
  - Scheduling
  - Budgeting
  - Work authorization
  - Cost accumulation
- It ensures all program activities are accounted for only once in the WBS and only once in the OBS
- It eliminates duplication

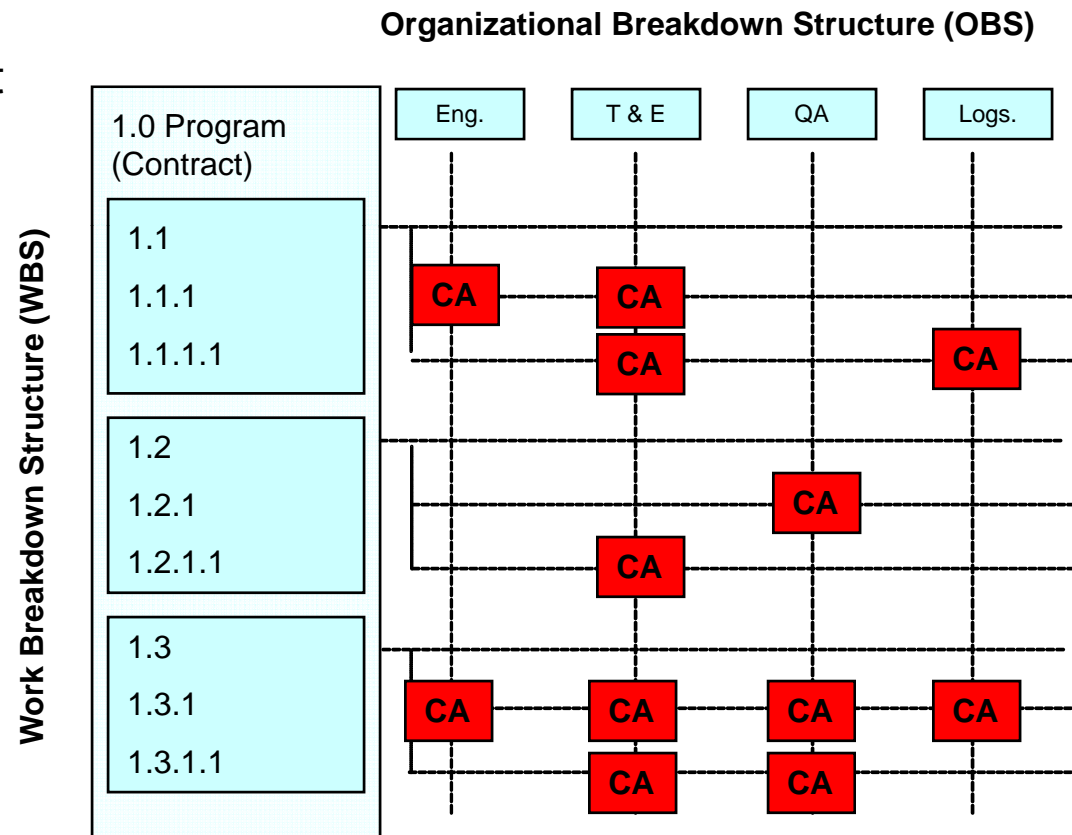


The RAM establishes performance and the baseline

# Control Accounts

Control Accounts (CA) represent the formal transfer of budget responsibility from the PM to the Cost Account Manager. It can include both WPs and Planning Packages

- The WBS and OBS intersect at the control account
- Individual responsibility is assigned at this level
- CA functions -
  - Program Planning
  - Program Scheduling
  - Program Budgeting
  - Performance Measurement
  - Cost and Schedule Analysis
  - Completion Estimates



The CA is where cost and schedule variance analysis occurs