

DCMA

Defense Contract Management Agency



Defense Contract Management Agency

DCMA

Defense Contract Management Agency

DCMA

Defense Contract Management Agency

OSD(AT&L) DAES Review Trip Wires

PEO/SYSCOM Conference “The Will to Change...”

***Presented by Mr. David Kester
Director, DCMA EVM Center***

November 7, 2006

DAES Purpose

- The DAES process enables the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) to fulfill his statutory obligation to manage and oversee Major Defense Acquisition Programs
- The Defense Acquisition Executive Summary (DAES) process is a means to surface problems with the intent of achieving early and effective resolution
- The DAES Review provides standard, comprehensive reporting of acquisition category I (ACAT I) and other designated programs
- A monthly DAES meeting facilitates communication between key stakeholders in OSD and the Services and assigns action items for follow-up
 - It is designed to provide, on a regular and systematic basis, indications of both potential and actual program problems before they become significant
- EVM is valuable because it can identify problems early enough so that actions can be taken to eliminate/minimize impacts

Increased Pressure to use EVM

- DoD Instruction 5000.2 and the Defense Acquisition Guidebook
 - March 7, 2005, USD(AT&L) EVM Policy Memorandum
- ASN(RDA) March 30, 2006, EVM Policy Letter
- OMB Circular A-11, Part 7 (Section 300)
- Sarbanes Oxley Act of 2002 (Sections 302, 404, 409)
 - Section 302: Corporate Responsibility For Financial Reports - Requires CEO and CFO to certify the accuracy of corporate financial reports;
 - Section 404: Management Assessment Of Internal Controls - Requires CEO, CFO and auditors to confirm the effectiveness of internal controls for financial reporting;
 - Section 409 - Real Time Disclosure - Requires any significant changes in financial state of issuer "on a rapid and current basis

Trip Wires Initiative

- DCMA working closely with ODUSD (AT&L) to develop a set of metrics and thresholds that will indicate that a program is heading south
 - ❑ Keep them simple
 - ❑ Keep them to a minimum
 - ❑ Keep them practical
- Data Source readily available across services
 - ❑ 252.242.7002 EVMS Clause
- Applicable to development, major modification, low rate initial and full rate production contracts

Integrated Program Parameters

- ❑ **Cost**
 - Realism of the cost estimate
 - Stability of funding sources

- ❑ **Schedule**
 - Completeness of the schedule plan
 - Realism of the schedule plan

- ❑ **Technical**
 - Clear understanding of scope requirements
 - Good technical definition of work
 - Technological achievability

- ❑ **Resources**
 - Realism of the resource plan (staffing availability and usage)

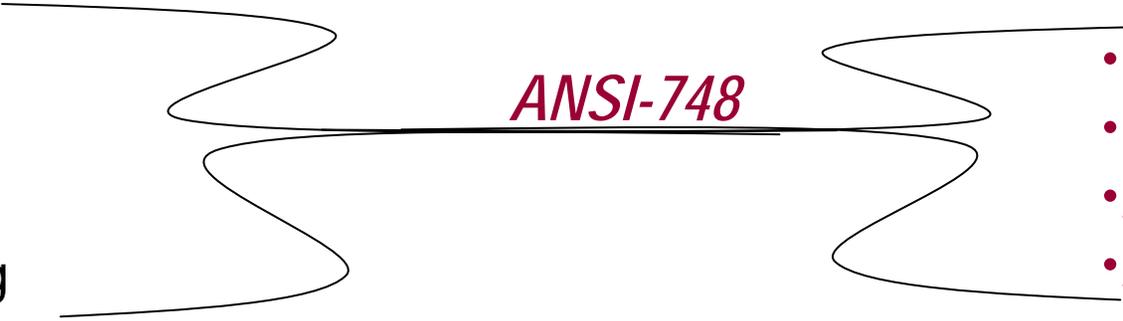
Primary Trip Wires

- ❑ DCMA EVM Center Contractor EVMS confidence rating
 - System Surveillance
 - Corrective Action Requests (CAR Levels 1-4)

- ❑ Integrated Baseline Review (IBR)
 - Initial review conducted within 180 days
 - Ongoing reviews triggered by major modifications and/or OTBs
 - Outcome of the review
 - Is scope fully and mutually understood
 - Does the baseline capture all work
 - Is MR adequate given expected risk
 - Does the contract have an executable, time-phased plan

Phases of Project Management

- Initiating
- Planning
- Executing
- Controlling
- Closing



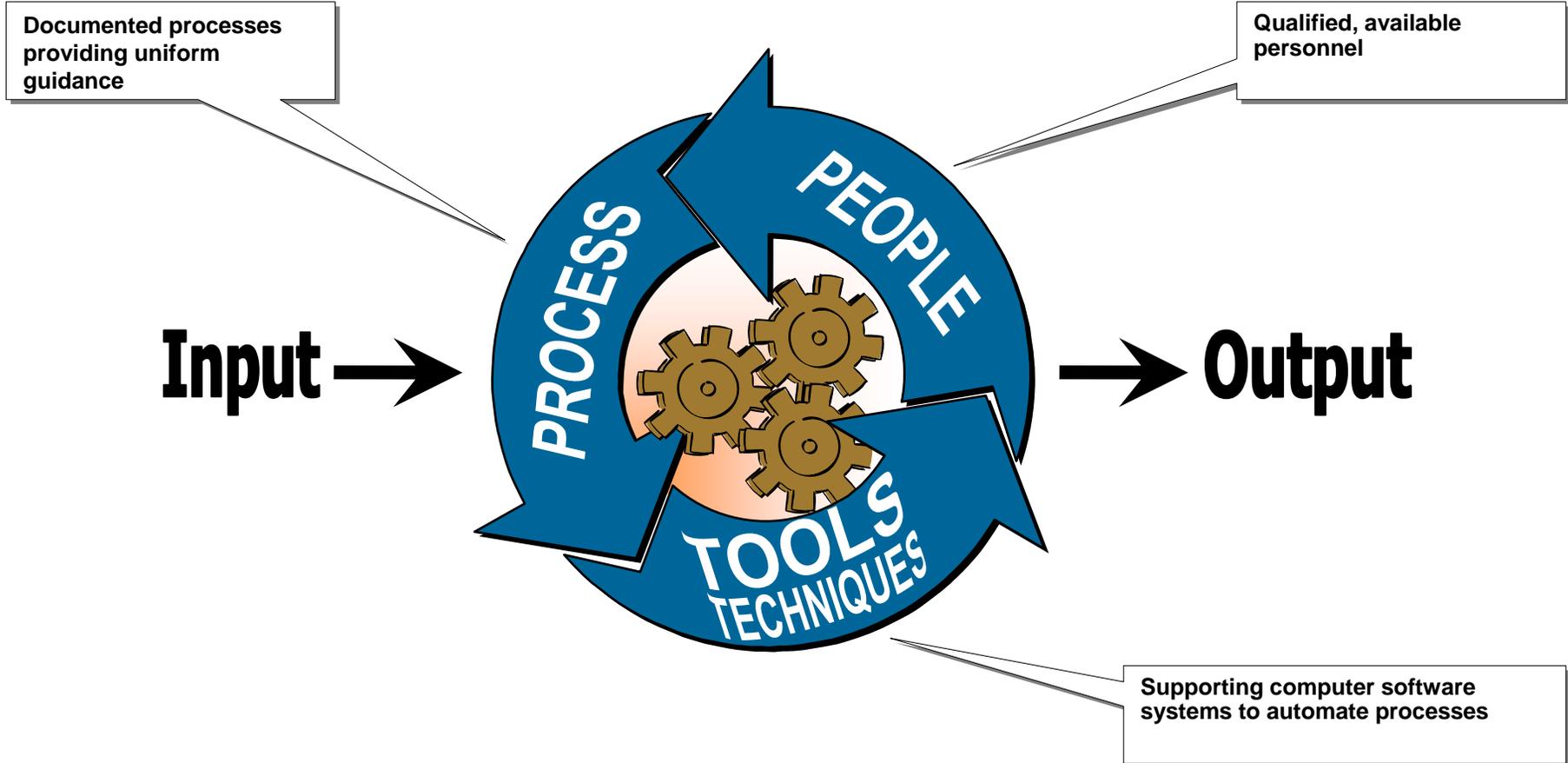
ANSI-748

- *Culture*
- *Organization*
- *Methods*
- *Mgt Systems*

EVMS Objectives

- Ensure that government activity and contractor Earned Value Management Systems (EVMS) provide data that:
 - Indicate work progress
 - Properly relate cost, schedule, and technical accomplishment
 - Are valid, timely, and auditable
 - Supply managers with a practicable level of summarization
- Ensure that government activities and contractors establish innovative, cost effective tools and processes, and improve them continuously
 - Experienced personnel
 - Tools that work in real time

Anatomy of a Management System



EVMS Watch List

1. PM,CAM ownership, inattention to budgetary responsibilities
2. Work authorization policies and procedures not always followed
3. Budget/data reconciliation issues
4. Lack of integrated management systems
5. Baseline fluctuations and frequent replannings
6. Current period and retroactive changes
7. Improper use of Management Reserve
8. EV techniques not reflecting actual accomplishment
9. Untimely, unrealistic Latest Revised Estimates
10. Monitor progress on a regular basis and in an integrated way
11. Zero budget work packages and control accounts
12. Lack of vertical and horizontal traceability (critical path)
13. Lack of critical subcontractor integration/oversight
14. Material performance and accounting misalignment
15. Not capturing and using cost and schedule data
16. Lack of predictive variance analysis (impact)
17. Internal controls and surveillance lacking
18. Managerial actions not demonstrated using EVM

Impact of EVMS Issues

- Uncontrolled Cost Overruns and Schedule Slips
 - Managers unable to identify problems and take immediate corrective action
 - Managers unable to assess the magnitude of problems
- Consequences
 - Inaccurate status information
 - Misleading cost and schedule performance trends
 - Delayed visibility of problems
 - EAC jumps and schedule slips (unwelcome surprises)

Time-Phased Baseline

- An initial and critical step in applying earned value management to a contract is the establishment of a time-phased Performance Measurement Baseline (PMB)
- The baseline must capture the entire technical scope of work, consistent with contract schedules, and must have adequate resources assigned
- The assignment of budgets to scheduled work produces the baseline against which actual performance can be compared
- Valid cost and schedule data depend on developing a meaningful baseline for controlling internal performance and reporting valid contract status
- Project managers are responsible for ensuring the accuracy of the baseline

Integrated Baseline Review (IBR)

Secondary: Trip Wire Metrics

- ❑ **Baseline Execution Index (BEI) – IMS**
 - Cum index less than .95
- ❑ **Critical Path Length Index (CPLI) – IMS**
 - Cum index less than .95
- ❑ **Schedule Performance Index (SPI) – CPR**
 - Cum index less than .95
- ❑ **Cost Performance Index (CPI) – CPR**
 - Cum index less than .95
- ❑ **To Complete Performance Index (TCPI) – CPR**
 - CPI to TCPI delta of 10%
- ❑ **PMB Revisions – CPR, CFSR**
 - Changes to Monthly Time-Phased PMB value of 5%
- ❑ **Contract Mods – ACO, PCO**
 - Contract Mods to Original Base value of 10%

IMS Duration Variances

- By itself, the earned value dollarized schedule variance will not reveal critical path information and should be analyzed in conjunction with network-based schedule information
- Earned value dollarized schedule variance status does:
 - Indicate the dollar value difference between of work that is ahead or behind the plan
 - Reflect a given measurement method
- Earned value dollarized schedule variance does not:
 - Address impact of work sequence
 - Address importance of work
 - Reflect critical path assessment
 - Indicate the time ahead/behind (or regain) schedule
 - Indicate amount of time it will slip
 - Indicate the cost needed to regain schedule

Baseline Execution Index (BEI)

□ Baseline Execution Index (BEI):

The Baseline Execution Index (BEI) metric is used to indicate the efficiency with which actual work has been accomplished when measured against the baseline

Example:

Through August 2005 the supplier network schedule shows 330 total tasks/activities to have been completed from contract start through the current reporting period; 196 total tasks/activities have actually been completed

Cumulative BEI = $196 \text{ Actual} / 330 \text{ Baseline} = 0.59$ efficiency through the current reporting period

In this example, the BEI of 0.59 falls well below 1.00 indicating a considerable portion of the program schedule is not being completed as originally planned. Through the current reporting period, the actual rate of completing only 196 tasks/activities or 59% of all work planned indicates 41% of work planned to be completed has been deferred to future periods. What's critical work?

Task Hit/Miss

❑ Task/activity Hit or Miss:

Graphically display the percentage of baseline tasks/activities actually completed (or Hit) for each month. A task/activity that is completed on or before its baseline finish date is considered a hit while a task/activity that is completed after its baseline finish date is considered a miss.

❑ Target efficiency ratio is "1.00"

At or near 1.00 = favorable; Less than 1.00 = unfavorable

Critical Path Length Index (CPLI)

❑ Critical Path Length Index (Realism)

Calculate and graphically display the longest, continuous sequence of tasks/activities through the network from contract start (or the current status date) to contract completion and other major program milestones

$$\text{CPLI} = \frac{\text{Critical Path Length} \pm \text{Total Float}}{\text{Critical Path Length}}$$

❑ Target efficiency ratio is "1.00"

Greater than 1.00 = favorable; Less than 1.00 = unfavorable

Example:

Through April the supplier network schedule calculates a program critical path length of 720 w/days (3 years) w/ 60 w/days (3 months) of negative float from contract award to completion; At present the supplier's CPLI of less than 1.00 indicates that program will not achieve its baseline completion date without corrective action; CPLI should be tracked to gauge the realism of completing the contract on time

$$\text{CPLI} = ((720 - 60) / 720) = 0.917$$

Total Float

□ Total Float (Realism)

Total Float is the total amount of time that a task can be delayed without delaying the completion of the contract/project

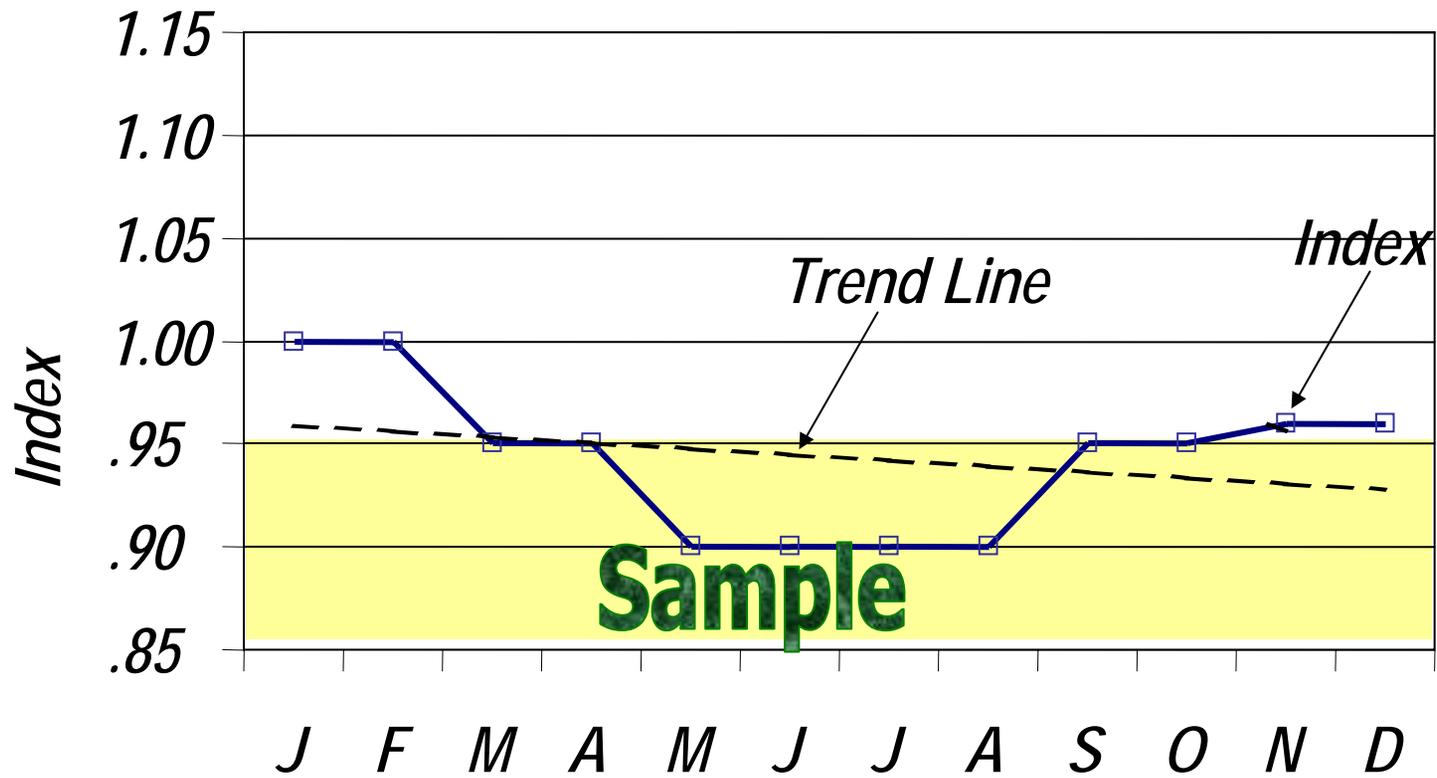
Negative float indicates no margin in the project's timeline and questions the baseline schedule's achievability

Total Float > 0 Indicates further delay is possible without delaying the contract/project

Total Float = 0 Indicates the contract/project will be completed exactly on time

Total Float < 0 Indicates the contract/project will be late

Tracking Critical Path Length Index



Earned Value Basic Data Elements

- Budgeted Cost for Work Scheduled (BCWS)
“What you plan to do, and when”
- Budgeted Cost for Work Performed (BCWP)
“What you’ve done”
- Actual Cost of Work Performed (ACWP)
“What it cost to do it”
- Budget at Completion (BAC)
“What you’ve got to do it with”
- Estimate at Completion (EAC)
“What you think its going to take to get it done”

Contract Performance Report

Unclassified
 CLASSIFICATION (When filled in)

COST PERFORMANCE REPORT												Page 2 of 2							
FORMAT 1 - WORK BREAKDOWN STRUCTURE												DOLLARS IN Thousands							
8. PERFORMANCE DATA																			
ITEM	CURRENT PERIOD					CUMULATIVE TO DATE					REPROGRAMMING ADJUSTMENTS		AT COMPLETION						
	BUDGETED COST		ACTUAL		VARIANCE		BUDGETED COST		ACTUAL		VARIANCE		COST VARIANCE		BUDGET	BUDGETED		ESTIMATED	VARIANCE
	WORK SCHEDULED	WORK PERFORMED	COST WORK PERFORMED	SCHEDULE	COST	WORK SCHEDULED	WORK PERFORMED	COST WORK PERFORMED	SCHEDULE	COST	COST VARIANCE	BUDGET	(14)	(15)	(16)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)							
a. WORK BREAKDOWN STRUCTURE ELEMENT																			
1.4.3 - Outlets/Switch	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			10.0	10.0	0.0				
1.4.4 - Fixtures	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0				
1.5 - PLUMBING	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			35.0	35.0	0.0				
1.5.1 - Water Lines	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			10.0	10.0	0.0				
1.5.2 - Waste Lines	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			10.0	10.0	0.0				
1.5.3 - Fixtures	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			15.0	15.0	0.0				
1.6 - INTERIOR	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			35.0	35.0	0.0				
1.6.1 - Walls	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			5.0	5.0	0.0				
1.6.2 - Cabinets	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			12.0	12.0	0.0				
1.6.3 - Trim	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			3.0	3.0	0.0				
1.6.4 - Carpet	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			15.0	15.0	0.0				
OV - OVERHEAD	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0				
b. COST OF MONEY	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0				
c. GENERAL & ADMINISTRATIVE	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0				
d. UNDISTRIBUTED BUDGET	2												0.0	0.0	0.0				
e. SUBTOTAL (Performance Measurement Baseline)		13.0	12.0	14.0	-1.0	-2.0	39.0	27.0	33.0	-12.0	-6.0	0.0	155.0	155.0	0.0				
f. MANAGEMENT RESERVE	2												0.0	0.0	0.0				
g. TOTAL		13.0	12.0	14.0	-1.0	-2.0	39.0	27.0	33.0	-12.0	-6.0	0.0	155.0						
9. RECONCILIATION TO CONTRACT BUDGET BASE																			
a. VARIANCE ADJUSTMENT										0.0	0.0								
b. TOTAL CONTRACT VARIANCE										-12.0	-6.0		155.0	155.0	0.0				

Unclassified
 CLASSIFICATION (When filled in)

□ Schedule Variance (SV)

- $SV = \text{Budgeted Cost for Work Performed (BCWP)} - \text{Budgeted Cost for Work Scheduled (BCWS)}$
- Negative variance means less work was performed than planned but not necessarily behind schedule

□ Schedule Variance Percentage (SV%)

- $SV\% = \frac{SV}{BCWS}$

Schedule Performance Index (SPI)

□ Schedule Performance Index (Efficiency)

$$\text{SPI} = \frac{\text{Budgeted Cost for Work Performed}}{\text{Budgeted Cost for Work Scheduled}}$$

$$\text{SPI} = \frac{\text{BCWP}}{\text{BCWS}}$$

□ Target efficiency ratio is "1.00"

Greater than 1.00 = favorable; Less than 1.00 = unfavorable

Example:

Through April the supplier is scheduled to perform \$39,000 worth of effort and reports that it has taken performance on \$27,000; Less work (0.692) has been accomplished than planned to date; SPI should be used to supplement critical path analysis

$$\text{SPI} = (\$27,000 / \$39,000 = 0.692)$$

CPR Cost Variance Metrics

❑ Cost Variance (CV)

- $CV = \text{Budgeted Cost for Work Performed (BCWP)} - \text{Actual Cost of Work Performed (ACWP)}$
- Negative variance means the cost of the work performed was greater than planned

❑ Cost Variance Percentage (CV%)

- $CV\% = \frac{CV}{BCWP}$

Cost Performance Index (CPI)

❑ Cost Performance Index (Efficiency)

$$\text{CPI} = \frac{\text{Budget for Work Planned}}{\text{Actual Cost of Work Performed}}$$

$$\text{CPI} = \frac{\text{BCWP}}{\text{ACWP}}$$

❑ Target efficiency ratio is "1.00"

Greater than 1.00 = favorable; Less than 1.00 = unfavorable

Example:

Through April the supplier has taken performance on \$27,000 worth of effort and reports that it has collected \$50,000 of actuals; To date the work performed has cost more than planned; CPI of .540 should be compared to the TCPI to gauge the realism of the Estimate at Completion (EAC)

$$\text{CPI} = (\$27,000 / \$50,000 = 0.540)$$

CPR Variance at Completion (VAC)

□ Variance at Completion (VAC)

- $VAC = \text{Budget at Completion (BAC)} - \text{Estimate at Completion (EAC)}$
- Negative variance means the forecasted cost of successfully completing the work (or program) is greater than the allocated budget

□ Variance at Completion Percentage (VAC%)

- $VAC\% = \frac{VAC}{BAC}$

To Complete Performance Index (Efficiency)

$$\text{TCPI (EAC)} = \frac{\text{BAC} - \text{BCWP}}{\text{EAC} - \text{ACWP}} \quad \begin{array}{l} \text{(Work Remaining)} \\ \text{(Remaining Cost)} \end{array}$$

Example:

BAC = \$100,000

BCWP = \$27,000

EAC = \$100,000

ACWP = \$50,000

$$\left. \begin{array}{l} \\ \\ \\ \end{array} \right\} \frac{\$100,000 - \$27,000}{\$100,000 - \$50,000} = 1.46$$

The supplier must perform at 1.46 of the originally planned performance in order to maintain (or achieve) the budget goal of \$100,000; TCPI should be compared to the CPI to gauge the realism of the Estimate at Completion (EAC)

Statistical CPI EAC

❑ Statistical Estimate at Completion (Realism)

Cumulative CPI

This method is calculated using a performance factor based on cumulative cost performance. Step by step, it is calculated as follows:

❑ Step 1. Compute the Performance Factor (PF) :
CPI (CUM)

❑ Step 2. Compute the quantity of work remaining (BCWR)
 $BCWR = BAC - BCWP (CUM)$

❑ Step 3. Compute the Estimate to Complete (ETC):
 $ETC = \frac{BCWR}{PF (CPI)}$

❑ Step 4. Compute the Estimate at Completion (EAC):
 $EAC = ETC + ACWP (CUM)$

Statistical CPI*SPI EAC

□ Statistical Estimate at Completion (Realism)

Cumulative CPI*SPI

This method is calculated using a performance factor based on cumulative cost and schedule performance. Step by step, it is calculated as follows:

□ Step 1. Compute the Performance Factor (PF) :

$$\text{CPI (CUM)} \times \text{SPI (CUM)}$$

□ Step 2. Compute the quantity of work remaining (BCWR)

$$\text{BCWR} = \text{BAC} - \text{BCWP (CUM)}$$

□ Step 3. Compute the Estimate to Complete (ETC):

$$\text{ETC} = \frac{\text{BCWR}}{\text{PF (CPI*SPI)}}$$

□ Step 4. Compute the Estimate at Completion (EAC):

$$\text{EAC} = \text{ETC} + \text{ACWP (CUM)}$$

Program Trip Wires Summary

Primary Trip Wires		Secondary Trip Wires						
System Indicator	Baseline Indicator	BEI	SPI	CPLI	CPI	CPI/TCPI	Contract Mods	Baseline Revs
		← <.95 →			10%		10%	5%
⊗	⊗	⊗ 0.59	0.99	⊗ 0.90	⊗ 0.93	⊗ 0.82	⊗ 250%	⊗ 90%

❑ Systems Indicator

- Company ABC EVMS certification withdrawn
- Major subcontractors do not hold EVMS certification
- DCMA CARs issued

❑ Baseline Indicator

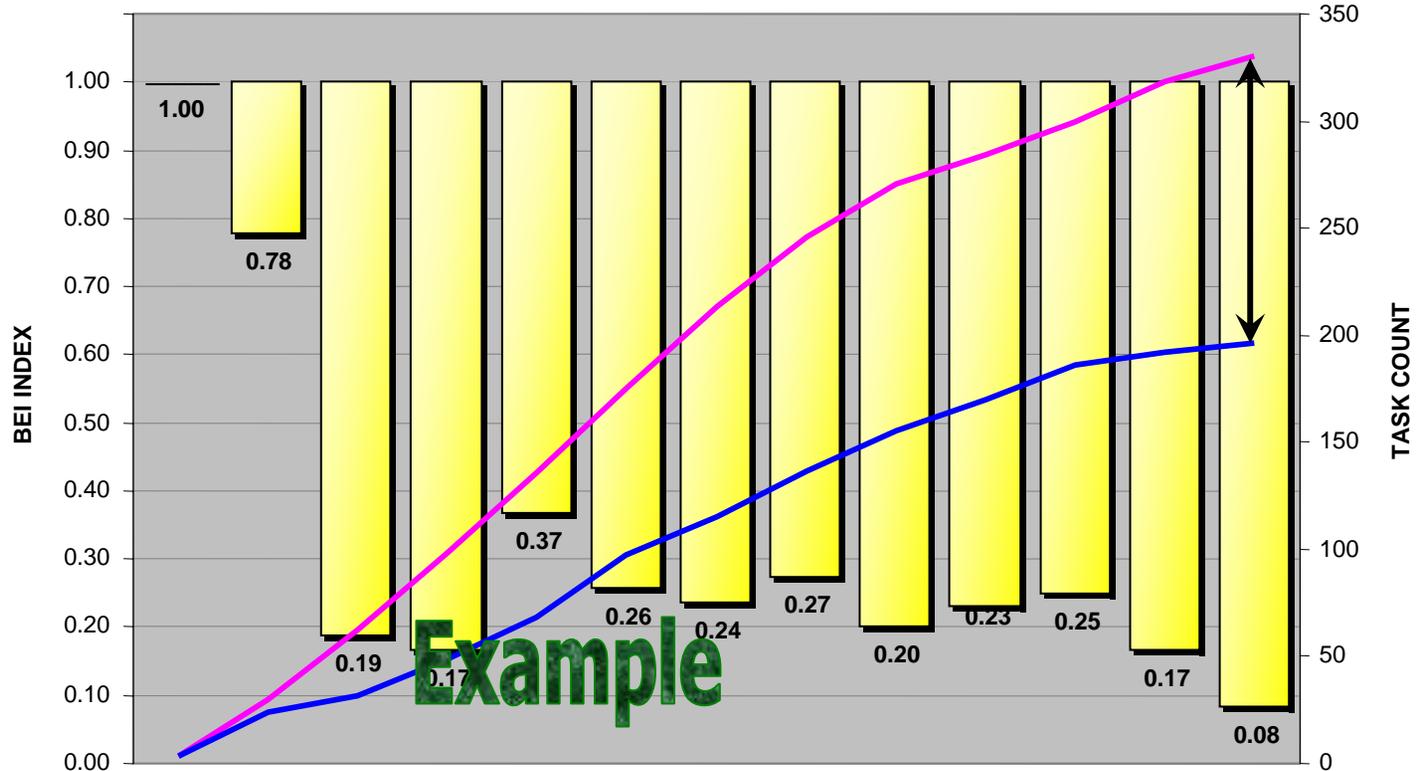
- Total work content and contract timeline absent from baseline
- \$300M in baseline disconnects identified and documented

❑ Secondary Trip Wires

- Inability to execute baseline task plan not reflected in SPI metric
- Contract value has increased by 250% since contract award
- Current period baseline revisions range from -27% to 90% per month
- Declining cost variance (-8.1%) and schedule variance (-10.2%)
- Optimistic Contractor EAC not in line with cumulative performance 30

Example

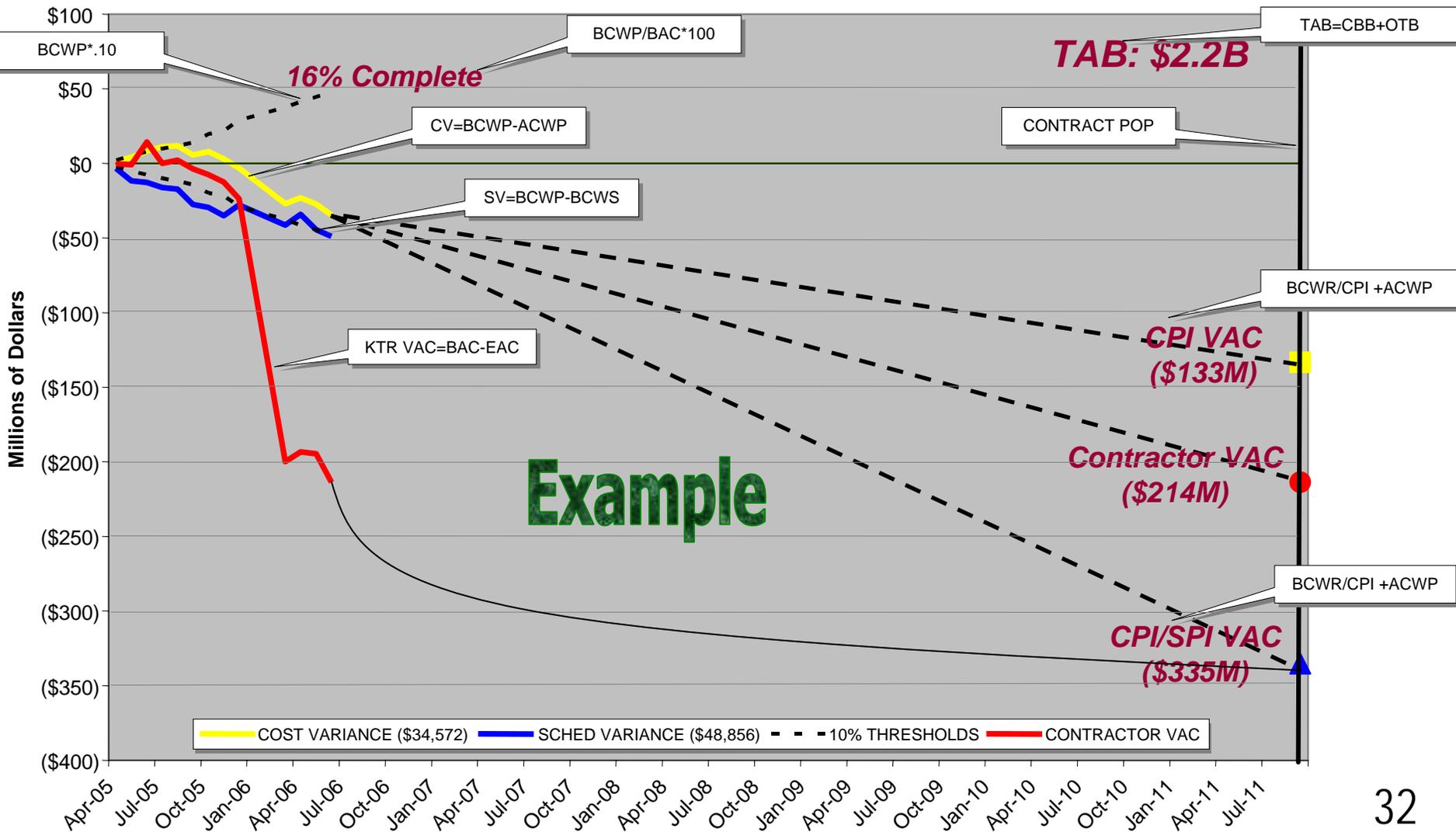
Baseline Execution Index (BEI)



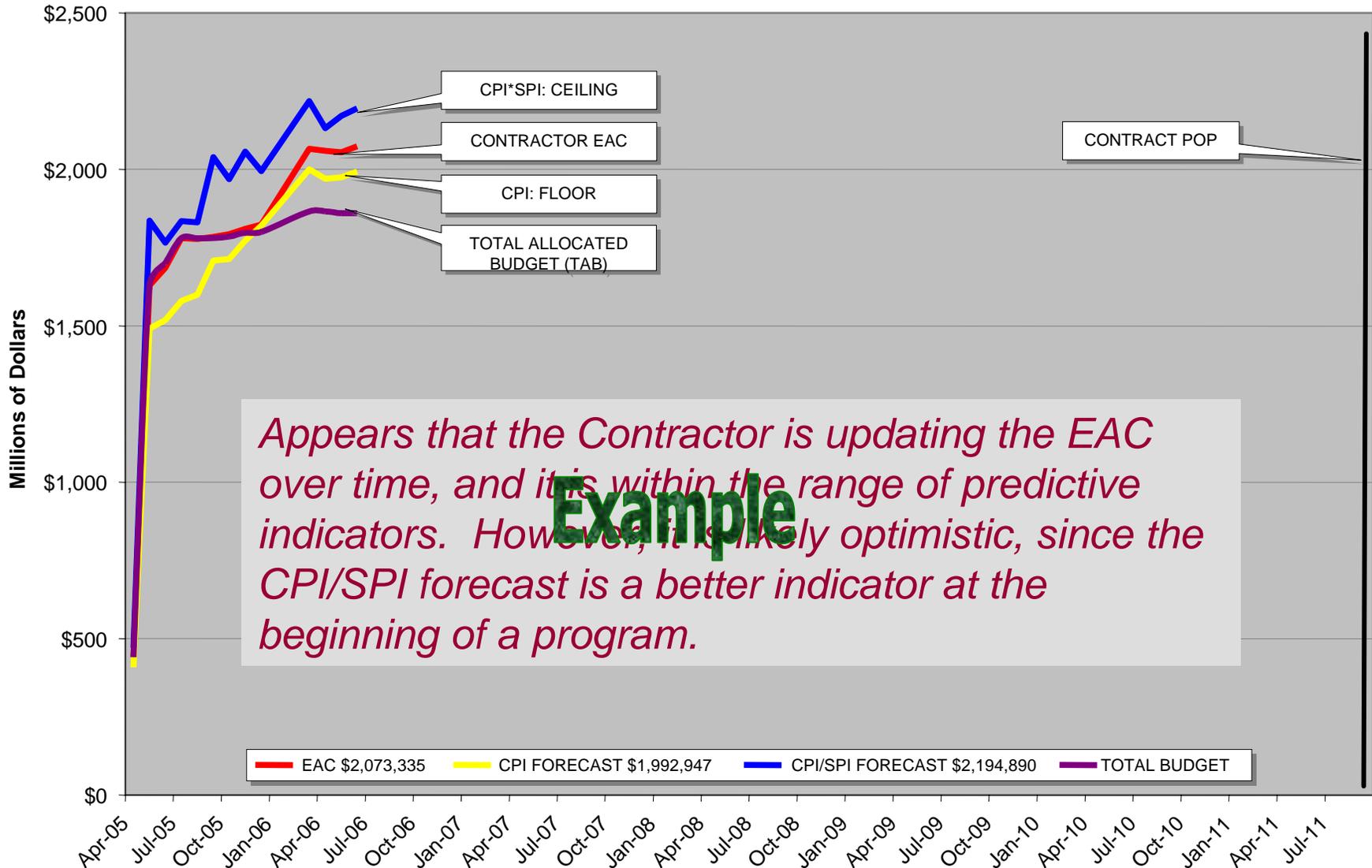
	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06
task hit / miss, monthly	1.00	0.78	0.19	0.17	0.37	0.26	0.24	0.27	0.20	0.23	0.25	0.17	0.08
Baseline cumulative	3	30	62	98	136	175	213	246	271	284	300	318	330
Actual cumulative	3	24	32	49	68	97	115	137	155	170	186	192	196

BEI

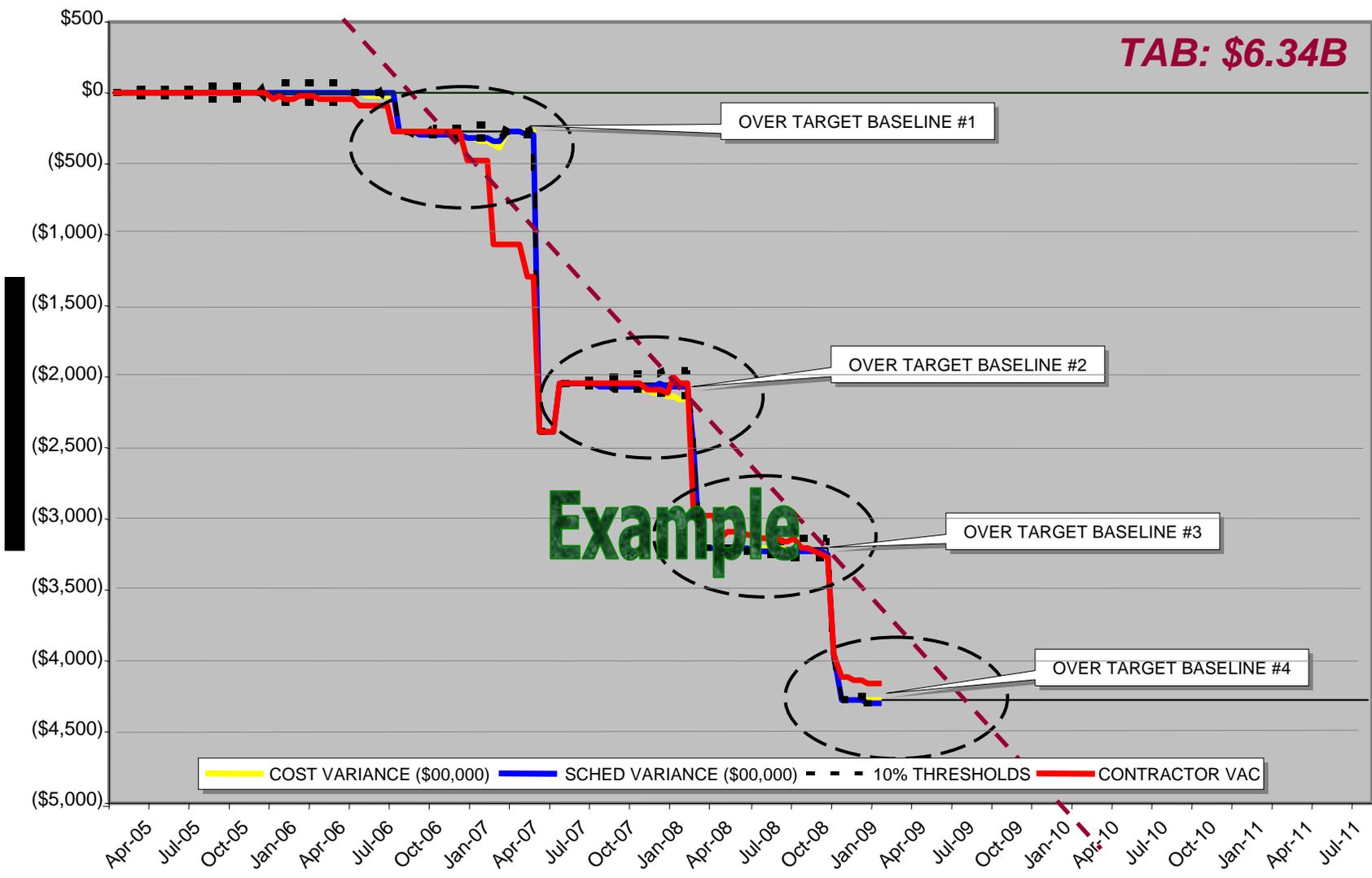
Cost/Schedule Variance Trends



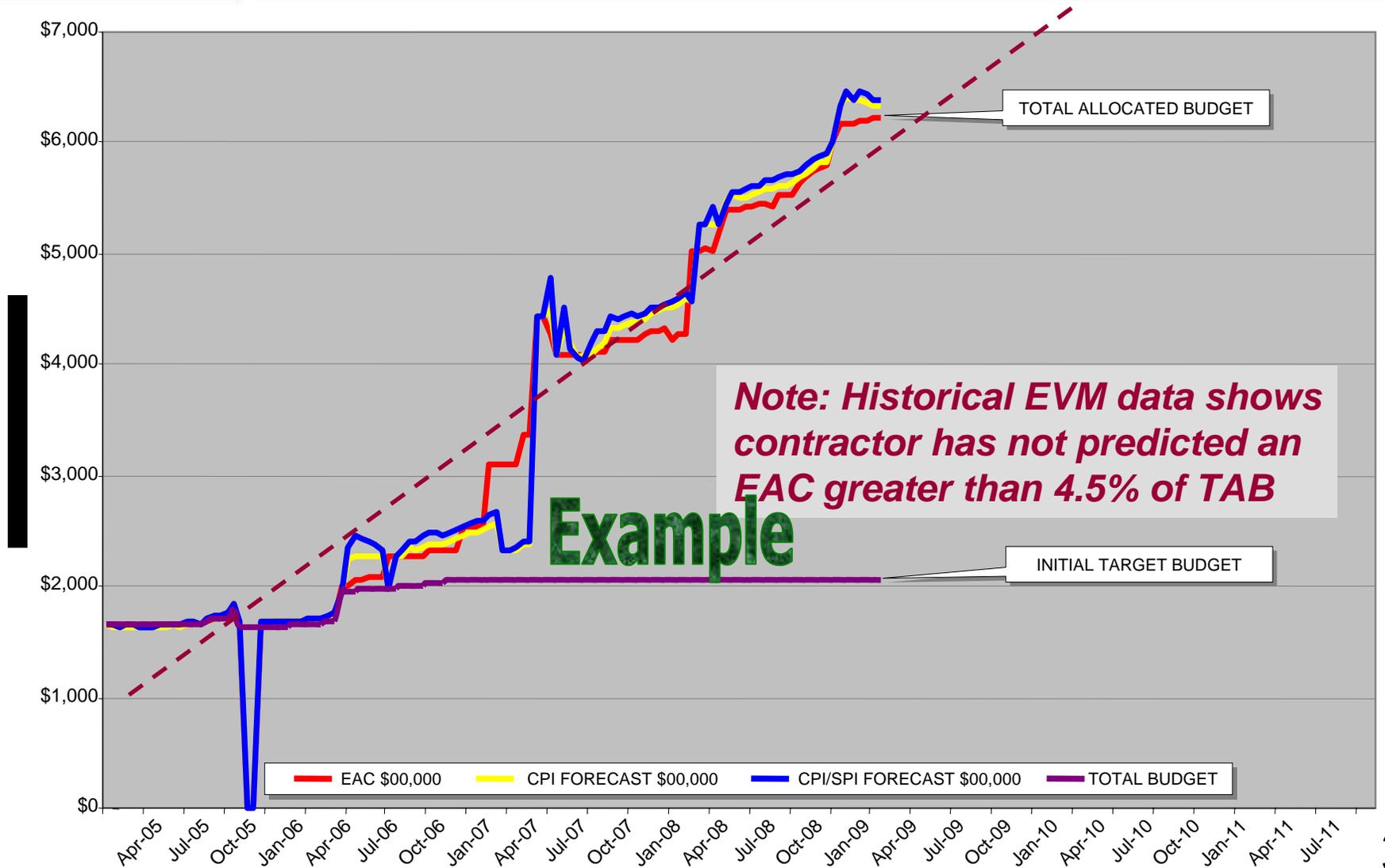
Contractor EAC Validity



Cost/Schedule Variance Trends (OTB)



Contractor EAC Validity (OTB)



DAES Trip Wire Process

