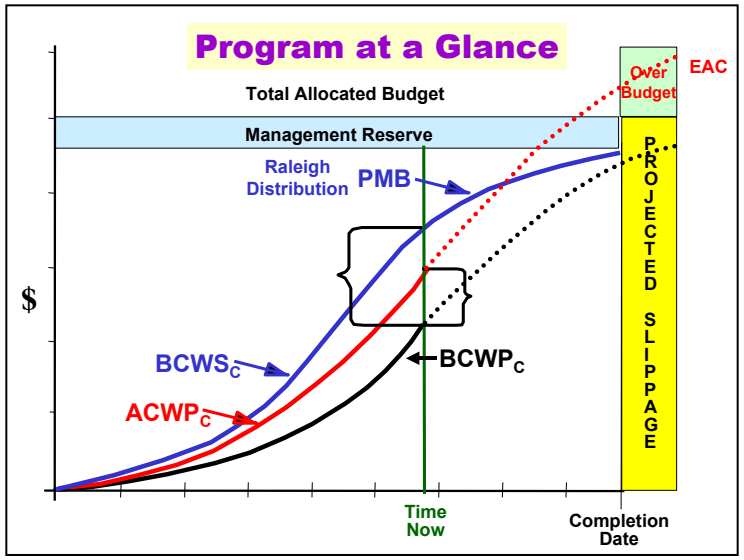

Earned Value and the Acquisition Program

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What is Earned Value Management?

- Definition
- EV Concept and Terms
- EV Policy Update (March 2005)
- EV in Program Execution (Reporting, Analysis, EACs, TCPI)
- Things to Look At (Analysis Tips)
- Possible Actions for EVM Reporting Issues
- Possible Actions for Issues Highlighted by EVM

Earned Value Management (EVM) Definition

The use of an integrated management system that coordinates work scope, schedule, & cost goals & objectively measures progress toward these goals.

EARNED VALUE CONCEPT

A Management Technique

Emphases Disciplined Integration of Technical Performance to Associated Co$t & Schedule

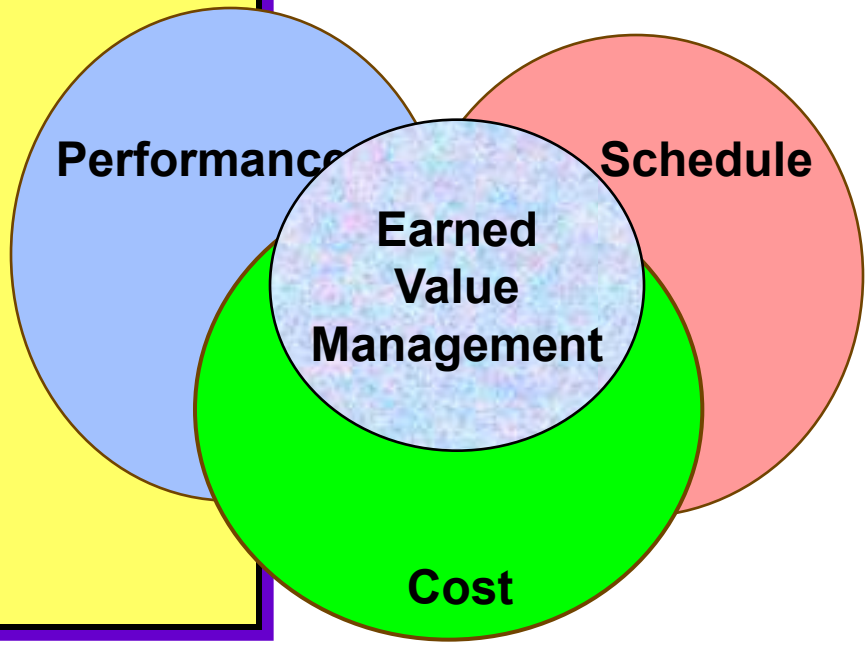
Objectively Measures Work Progress

States Value of Work Completed in $s

Provides Objective Cost & Schedule Metrics

Enables Trend Analysis & CAIV Trades

Industry Standard ANSI/EIA-748-2013

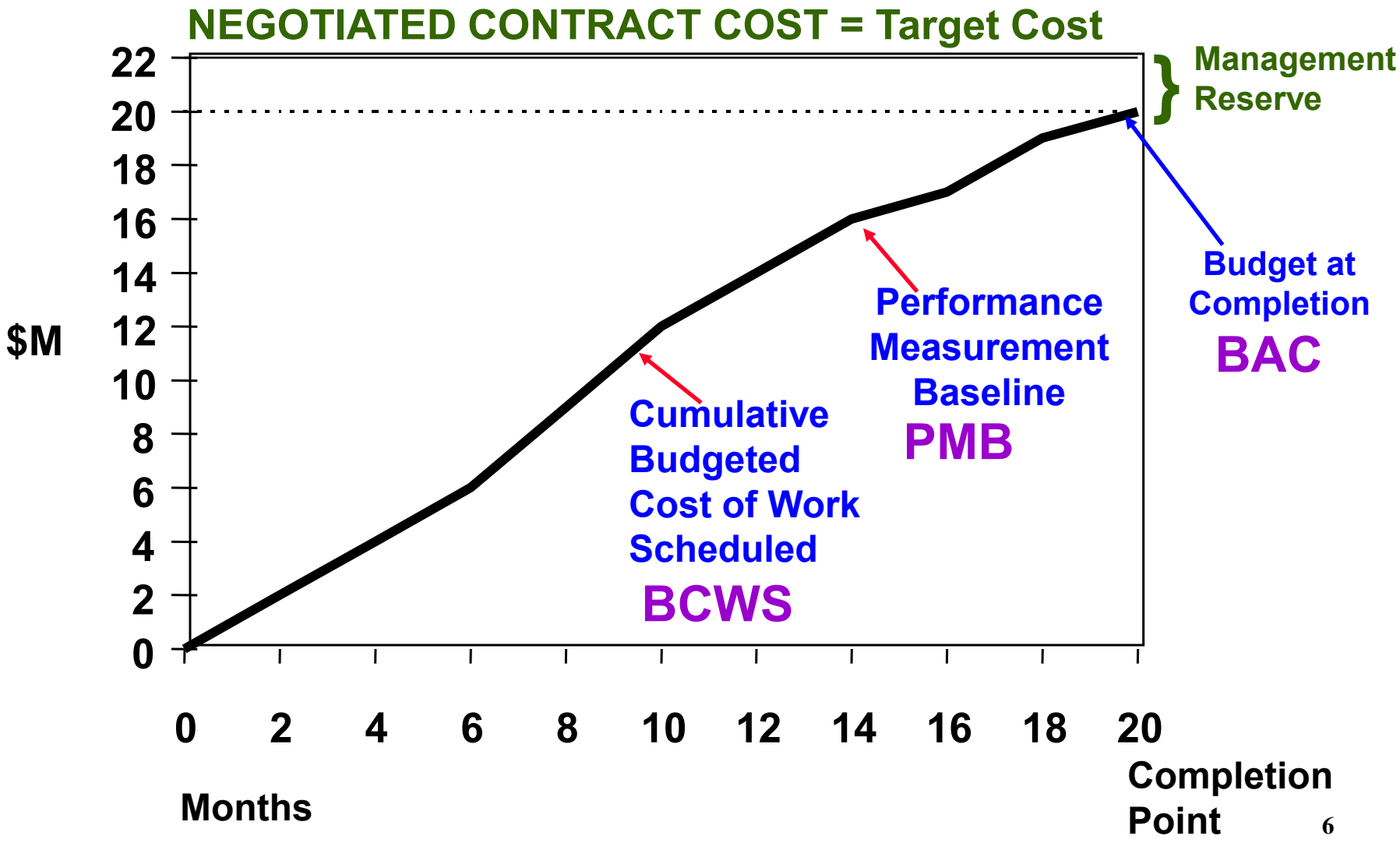


DoD & Industry embrace EARNED VALUE as a Risk Management Tool

Earned Value Terminology

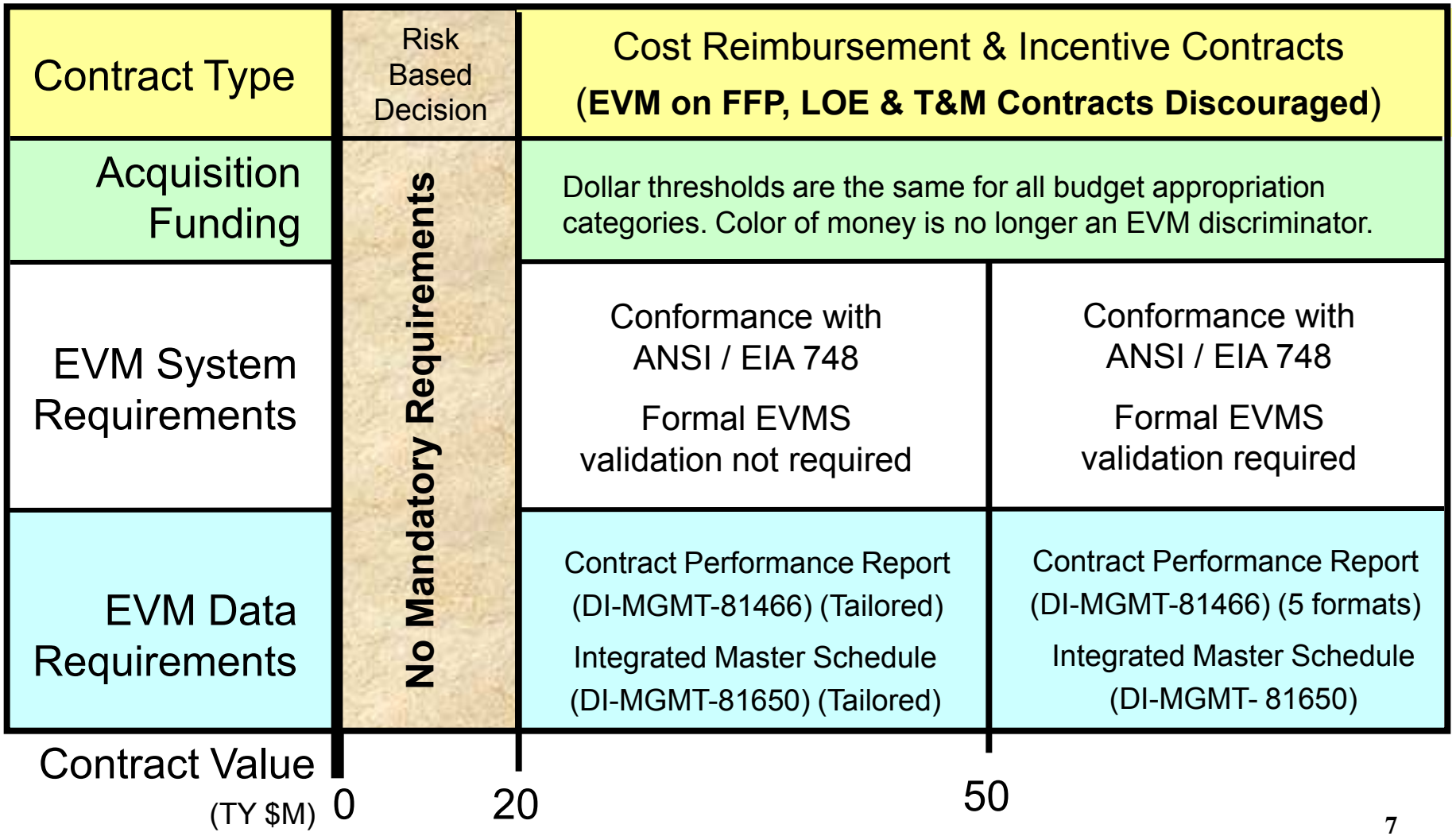
Acronym	Term	Meaning
BCWS	Budget Cost of Work Scheduled	Plan - Baseline - PMB
BCWP	Budget Cost of Work Performed	Earned Value
ACWP	Actual Cost of Work Performed	Actuals
BAC	Budget At Completion	Planned Cost
EAC	Estimate At Completion	Forecasted Cost
SV	Schedule Variance	Accomplishment Variance
CV	Cost Variance	EV vs Actual Cost
VAC	Variance At Completion	Forecasted Overrun / Underrun

The Time-Phased Spend Plan



Earned Value Management Guidance

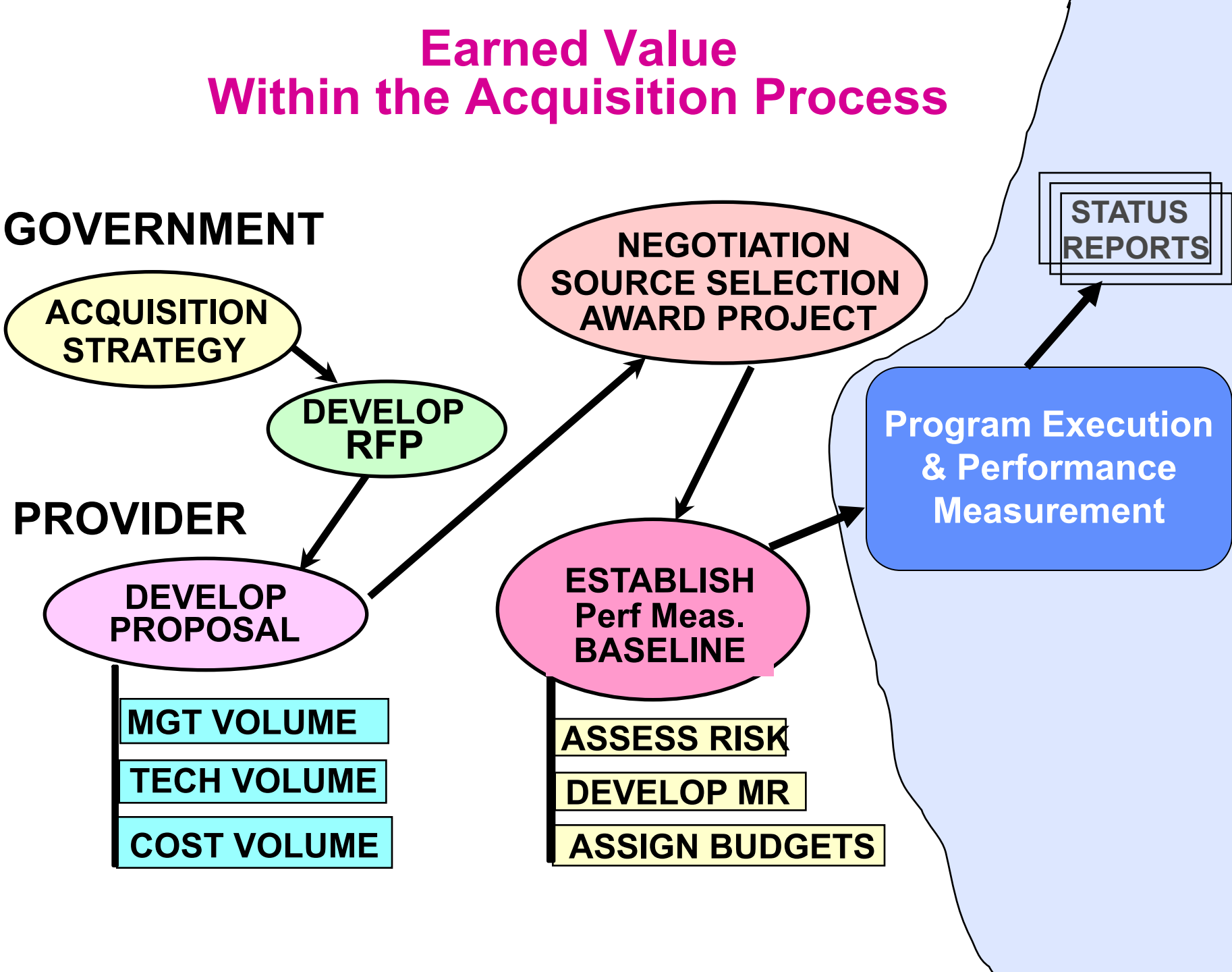
Policy Established in March 2005 (DODI 5000.02)



EV in Program Execution

- Data Reporting
- Data Analysis
  - Variances
  - Performance Indices
  - Trends
- Estimates at Completion (EACs)
- To Complete Performance Index (TCPI)

Earned Value
Within the Acquisition Process



Contract/Cost Performance Report (CPR)

- **Format 1: WBS**
- **Format 2: Organizational Categories**
- **Format 3: Baseline**
- **Format 4: Staffing**
- **Format 5: Explanations and Problem Analysis**

NOTE: New DID effective 1 Jul 2012 for IPMR (Integrated Program Management Report), per 19 Jun 2012 memo signed by Ms. McFarland. Adds Format 6 (Integrated Master Schedule) and Format 7 (Electronic History and Forecast File)

CPR Format 1: WBS

CLASSIFICATION *(When filled in)*

CONTRACT PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE DOLLARS IN _____

1. CONTRACTOR	2. CONTRACT	3. PROGRAM	4. REPORT PERIOD
a. NAME	a. NAME	a. NAME	a. FROM *(YYMMDD)*
b. LOCATION *(Address and ZIP Code)*	b. NUMBER		b. TO *(YYMMDD)*
	c. TYPE / d. SHARE RATIO	b. PHASE *(X one)* ☐ RDT&E ☐ PRODUCTION	

5. CONTRACT DATA

a. QUANTITY	b. NEGOTIATED COST	c. EST. COST AUTHORIZED UNPRICED WORK	d. TARGET PROFIT/ FEE	e. TARGET PRICE	f. ESTIMATED PRICE	g. CONTRACT CEILING	h. ESTIMATED CONTRACT CEILING

6. ESTIMATED COST AT COMPLETION	MANAGEMENT ESTIMATE AT COMPLETION (1)	CONTRACT BUDGET BASE (2)	VARIANCE (3)
a. BEST CASE			
b. WORST CASE			
c. MOST LIKELY			

7. AUTHORIZED CONTRACTOR REPRESENTATIVE		
a. NAME *(Last, First, Middle Initial)*	b. TITLE	
c. SIGNATURE		d. DATE SIGNED *(YYMMDD)*

8. PERFORMANCE DATA

ITEM (1)	CURRENT PERIOD: BUDGETED COST WORK SCHEDULED (2)	BUDGETED COST WORK PERFORMED (3)	ACTUAL COST WORK PERFORMED (4)	VARIANCE SCHEDULE (5)	VARIANCE COST (6)	CUMULATIVE TO DATE: BUDGETED COST WORK SCHEDULED (7)	BUDGETED COST WORK PERFORMED (8)	ACTUAL COST WORK PERFORMED (9)	VARIANCE SCHEDULE (10)	VARIANCE COST (11)	REPROGRAMMING ADJUSTMENTS: COST VARIANCE (12)	REPROGRAMMING ADJUSTMENTS: BUDGET (13)	AT COMPLETION: BUDGETED (14)	AT COMPLETION: ESTIMATED (15)	AT COMPLETION: VARIANCE (16)
a. WORK BREAKDOWN STRUCTURE ELEMENT	BCWS	BCWP	ACWP	SV	CV	BCWS	BCWP	ACWP	SV	CV			BAC	EAC	VAC
b. COST OF MONEY															
c. GENERAL & ADMINISTRATIVE															
d. UNDISTRIBUTED BUDGET															
e. SUBTOTAL *(Performance Measurement Baseline)*															
f. MANAGEMENT RESERVE															
g. TOTAL															
9. RECONCILIATION TO CONTRACT BUDGET BASE															
a. VARIANCE ADJUSTMENT															
b. TOTAL CONTRACT VARIANCE															

CLASSIFICATION *(When filled in)*

How to Tailor the CPR

- Can tailor content and/or frequency
- Format 1: WBS
  - Default WBS level 3
  - Consider Level 4/5 for high risk/dollar areas
  - No more than 2 pages
- Format 2: Organizational Categories
  - This should be useful for your program
  - Consider aligning to IPTs
- Format 3: Baseline
- Format 4: Staffing
  - This will be in the same breakout as Format 2
- Format 5: Explanations and Problem Analysis
  - Thresholds for variance analysis reporting should support management by exception concept
  - Review thresholds periodically

NOTE: Smaller programs may only need Formats 1 or 2 and Format 5

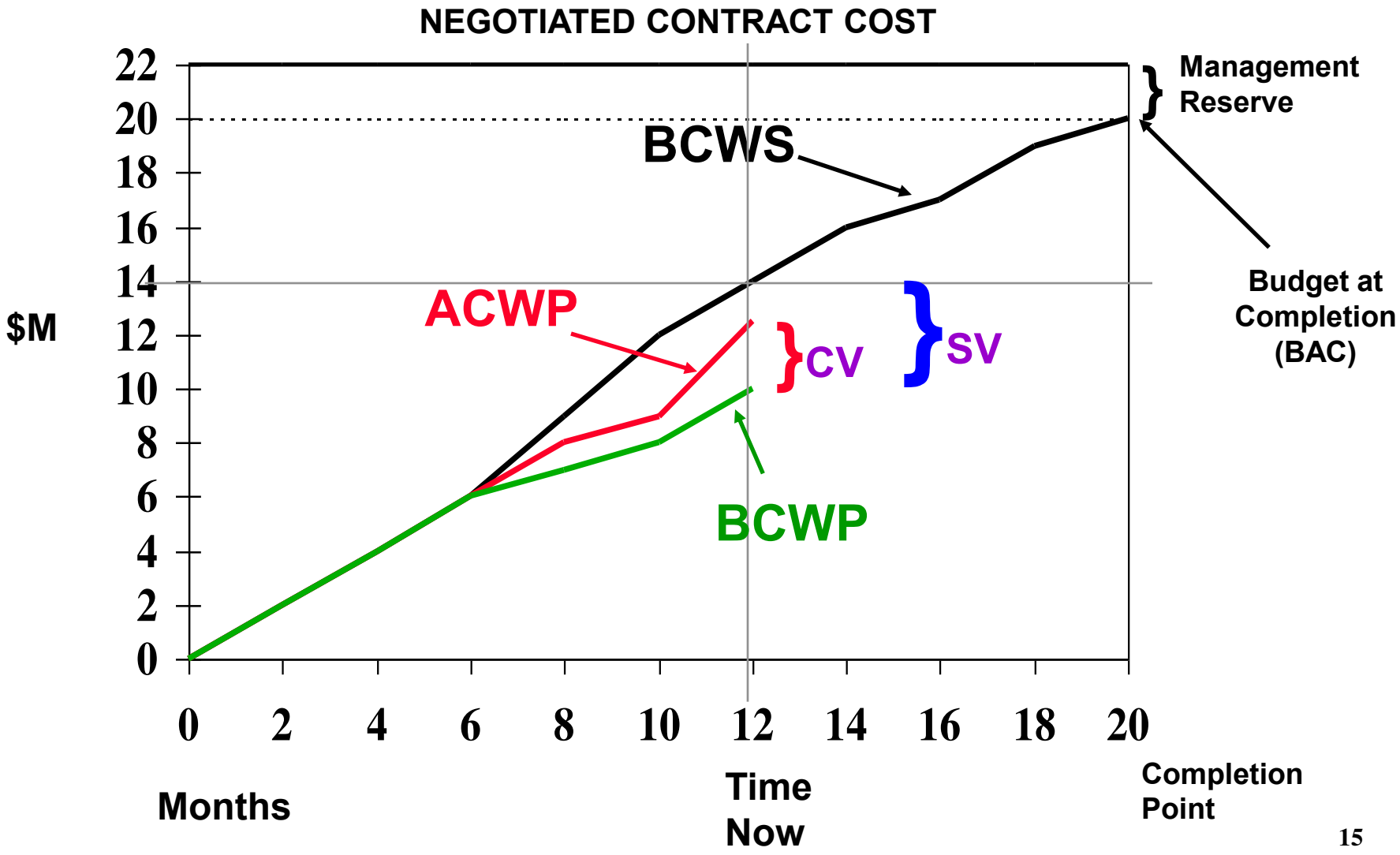
Basic Performance Data Analysis Objectives

- Determine current status
  -- Where are we today?
- Identify trends
  -- Where are we headed?
  -- Any cost, schedule surprises ?
- Forecast the future
  -- What is the estimated cost at completion?
- Indicate areas for management action
  -- What should we do now?

Earned Value Metrics

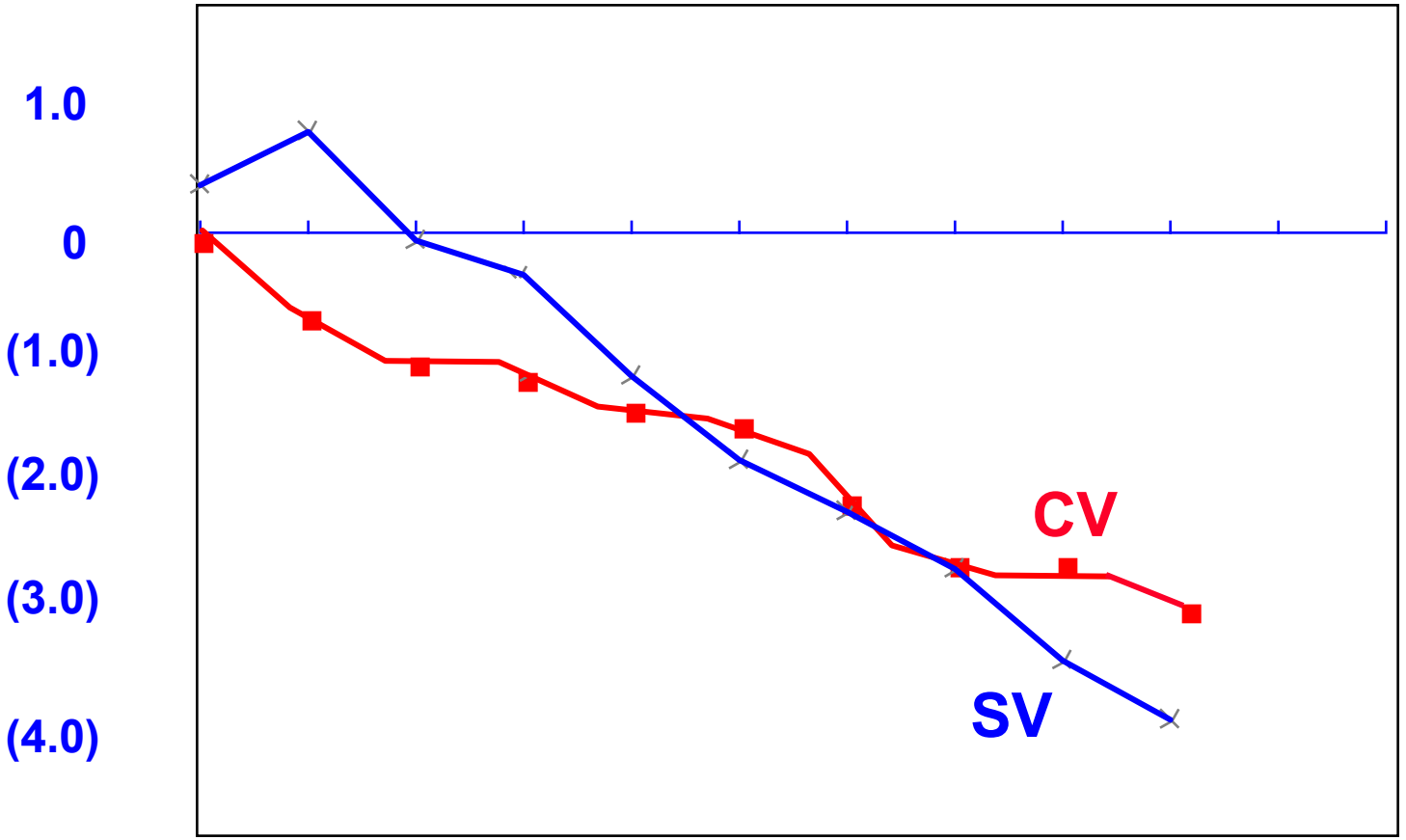
- Variances
  - Cost and schedule
  - Current month and cumulative
- Performance indices
  - Cost Performance Index (CPI)
  - Schedule Performance Index (SPI)
  - Percent complete
  - Percent spent
  - To Complete Performance Index (TCPI)

The Earned Value Current Status Imposed On The Spend Plan



Cumulative Dollar Variance
Cost and Schedule Trends

$ in Millions



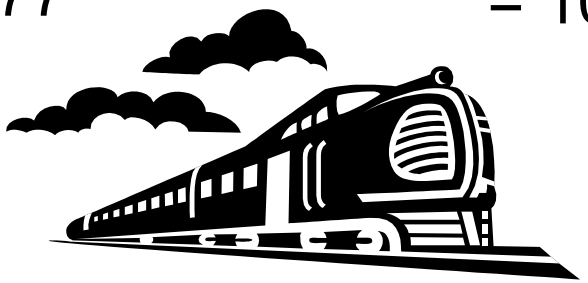
Performance Metrics

- Cost Variance
  = BCWP - ACWP
  = 10-13 = -3M
- Schedule Variance
  = BCWP - BCWS
  = 10 - 14 = -4M
- Cost Performance Index
  = BCWP/ACWP
  = 10/13 = .77

Percent Complete
= BCWP/BAC
= 10/20 = 50%

Percent Spent
= ACWP/BAC
= 13/20 = 65%

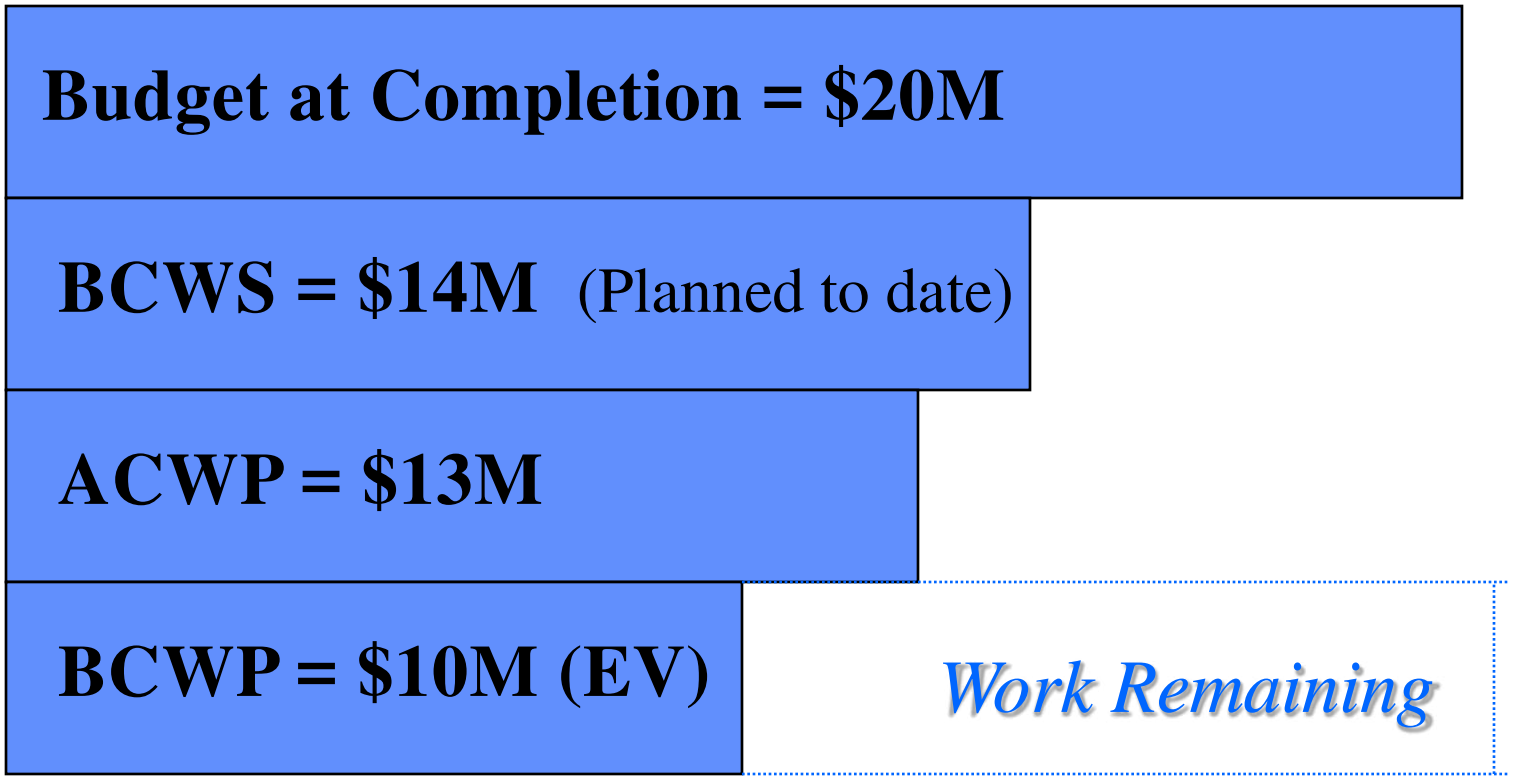
Schedule Performance Index
= BCWP/BCWS
= 10/14 = .71



Estimate at Completion
BAC/CPI = 20/.77 = $26M

Estimate at Completion (EAC)

EAC = Actual Costs accumulated to date + Estimated Cost of the Work Remaining



EAC Concept

EAC = ACWP + Estimate to Complete

$$EAC = ACWP + \frac{\text{Work Remaining}}{\text{Performance Factor}}$$

$$EAC = ACWP + \frac{(BAC - BCWP)}{CPI_c}$$

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

Note: This EAC assumes that future performance will be the same as that represented by CPIc.

EAC Methods

METHOD	FORMULA
1. Cumulative CPI	$ACWP_C + \frac{BAC - BCWP_C}{CPI_C}$
2. Composite	$ACWP_C + \frac{BAC - BCWP_C}{CPI_C \times SPI_C}$
3. 3-Month CPI	$ACWP_C + \frac{BAC - BCWP_C}{\frac{(BCWP)}{(ACWP)}_{3\ MO}}$
4. Weighted	$ACWP_C + \frac{BAC - BCWP_C}{.8\ CPI_C + .2SPI_C}$

Note: $_c$ Indicates cumulative data

To Complete Performance Index (TCPI)

$$TCPI_{EAC} = \frac{\text{Work Remaining}}{\text{Budget Required for EAC (or cost remaining)}}$$

$$= \frac{\text{BAC-Cumulative BCWP}}{\text{EAC- Cumulative ACWP}}$$

The *CPI from today until contract completion* required to achieve the EAC. Or,

The *level of efficiency* required from today to completion to achieve the EAC.

Note: Compare $TCPI_{EAC}$ to cum CPI for "believability" check

Things to Look At
(Analysis Tips)

- Look at CPI in latest CPR - What is CPI cum now?
- Look at CPI trend - Rate of change? CPI cum drop of 1% per month, not green
- Look at SPI trend – Rate of change? Chasing schedule?
- Compare CV and use of Management Reserve – MR vs Work Remaining?
- Compare govt EAC to ktr LRE – Which is higher?
- Calculate TCPI for each (govt Most Likely EAC and ktr ML LRE)
- Compare percent complete to percent spent – greater than 10%, not green
- Look at trend charts for rebaselinings – How many? When was last one?
- Look at trend charts relative to +/- 10% (OSD) and +/- 5% (DCMA tripwires)
- Take govt EAC to price and compare to budget (contract total on the R-3)

- When was the last IBR? How did it go? – How many findings? CARs?

Possible Actions for EVM Reporting Issues

- PMO discussions with contractor
- PMO engages DCMA for assistance
- Discussions with contractor at levels above PM
- PCO letter
- Award/Incentive fee impact
- CPAR input
- CARs (Correction Action Request)-Levels 1-4
  - DCMA initiated
- Conduct an IBR
- Conduct a compliance review
- Withhold payment up to 5%
- Pull contractor's EVM validation

Possible Actions for Issues Highlighted by EVM

Question: What do you do?

Answer:

1. **Find the root cause…..talk to the contractor**
   - **Does it relate to a KPP or KSA?**
     - **If yes…**
       - **Is there any trade space?**
       - **Discuss options with the contractor**
       - **Discuss options with the user**
     - **If no…**
       - **Discuss options with the contractor**
       - **Discuss options within Acquisition community**
2. **Take action to help resolve/mitigate the problem**

Any Questions?

wInsight
Current Period

Date	Nov 13	Dec 13	Jan 14	Feb 14	Mar 14	Apr 14
			Current			
BCWS	11,245	9,898	9,898	6,325	5,974	4,568
BCWP	10,425	9,371	9,605	6,208	6,032	4,744
ACWP	11,772	10,659	10,601	7,028	6,560	5,388
SCH VAR $	-820	-527	-293	-117	59	176
SCH VAR %	-7%	-5%	-3%	-2%	1%	4%
SPI	0.93	0.95	0.97	0.98	1.01	1.04
COST VAR $	-1,347	-1,288	-996	-820	-527	-644
COST VAR %	-13%	-14%	-10%	-13%	-9%	-14%
CPI	0.89	0.88	0.91	0.88	0.92	0.88

Entries in Black are Input data

Entries in Red are Calculated

wInsight
Cumulative

Date	Nov 13	Dec 13	Jan 14	Feb 14	Mar 14	Apr 14
			Cumulative			
BCWS	66,649	76,547	86,445	92,770	98,744	103,312
BCWP	63,276	72,647	82,252	88,460	94,492	99,236
ACWP	68,945	79,604	90,205	97,233	103,793	109,181
SCH VAR $	-3,373	-3,901	-4,193	-4,311	-4,252	-4,076
SCH VAR %	-5%	-5%	-5%	-5%	-4%	-4%
SPI	0.95	0.95	0.95	0.95	0.96	0.96
COST VAR $	-5,669	-6,958	-7,953	-8,773	-9,300	-9,945
COST VAR %	-9%	-10%	-10%	-10%	-10%	-10%
CPI	0.92	0.91	0.91	0.91	0.91	0.91
3 MONTH CPI	0.90	0.89	0.88	0.89	0.89	0.90
6 MONTH CPI	0.92	0.91	0.90	0.89	0.89	0.89

wInsight
At Completion

			At Completion			
TCPI - BAC	1.09	1.14	1.20	1.27	1.35	1.47
TCPI - EAC	1.34	1.42	1.61	1.83	2.07	2.62
CBB / TAB	130,149	130,149	130,149	130,149	130,149	130,149
EAC (Kr)	119,000	120,000	120,000	120,000	121,000	121,000
VAC $	11,149	10,149	10,149	10,149	9,149	9,149
VAC %	8.6%	7.8%	7.8%	7.8%	7.0%	7.0%
% SCHED - BAC	51%	59%	66%	71%	76%	79%
% COMP - BAC	49%	56%	63%	68%	73%	76%
% SPENT - BAC	53%	61%	69%	75%	80%	84%
SLIP IN WEEKS	-	-	-	-	-	-

wInsight
EAC Forecasts

Date	Nov 13	Dec 13	Jan 14	Feb 14	Mar 14	Apr 14
			EAC Forecasts			
3 MO AVG	140,646	141,735	142,385	142,802	142,917	143,069
6 MO AVG	138,815	139,871	140,871	141,716	142,324	142,726
CUM CPI	141,810	142,614	142,734	143,057	142,959	143,192
CUR CPI	146,966	148,045	143,640	147,339	141,521	147,824
CPI*SPI	145,695	145,997	145,412	145,290	144,722	144,589

OSD Position on EACs:

- **When a contract is more than 20% complete:**
  - ***1. The overrun at completion will be more than the overrun incurred to date***
  - ***2. The percent overrun at completion will be greater than percent overrun incurred to date***
- **Based on OSD database of more than 500 major DOD contracts since 1977**