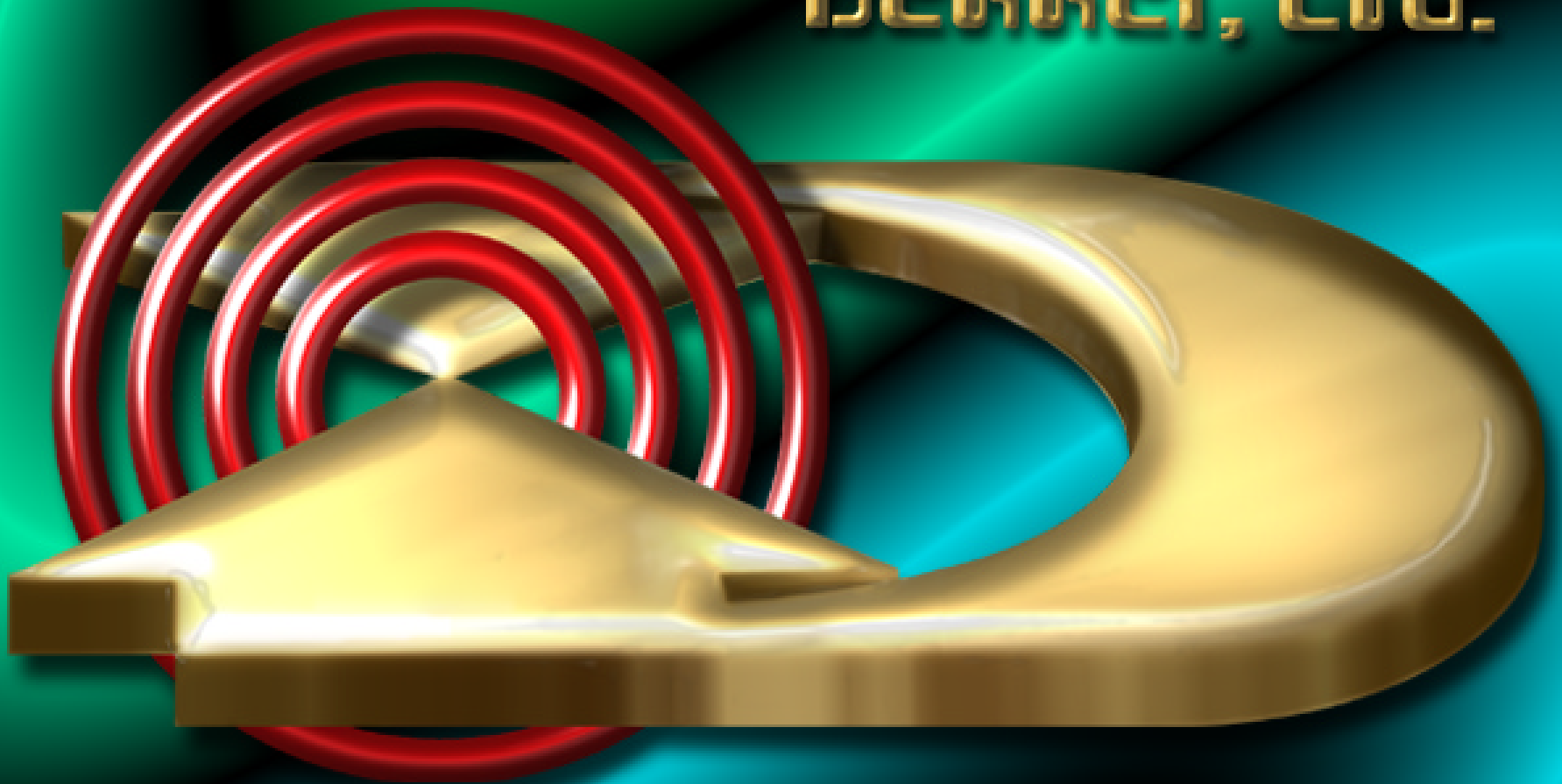


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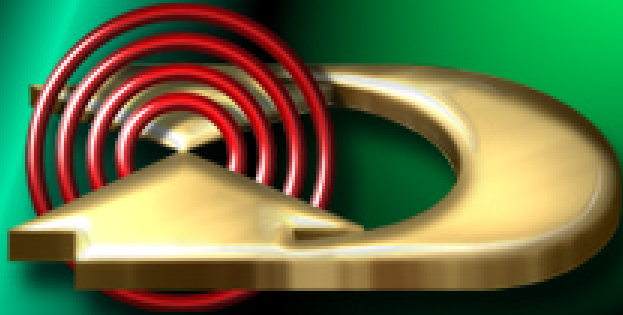
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Emerging Ideas

Relating EVM to “Real” Schedules

Wayne Abba

Dekker, Ltd.



Old Concepts - New Ideas

- Schedule variance
 - ◆ What it is
 - ◆ Strengths
 - ◆ Weaknesses (misunderstandings?)
 - ◆ Unleashing the power of schedule information
 - ◆ Reconciling earned value schedule and “real” schedule
- Cost variance
- Risk management
- Management reporting and presentation



Schedule Variance

- Definition
 - ◆ Earned Value (BCWP) minus Planned Value (BCWS)
- Positive (+) variance indicates volume of work performed ahead of plan
- Negative (-) variance indicates volume of work performed behind plan



Schedule Variance Example

- Planned value: 50
- Earned value: 40
- Actual cost: 35
 - ◆ Schedule variance = $40 - 50 = (10)$
 - ◆ Schedule variance percent = $10/50 = 20\%$
 - ◆ Schedule performance index = $40/50 = .8$
- What does this tell us?
 - ◆ Behind schedule?
 - ◆ What? By how much?



The Maligned Metric

- “Schedule” Variance
 - ◆ Doesn’t measure time
 - ◆ Doesn’t reveal if the right work was done
 - ◆ A positive variance is not necessarily good
 - ◆ A negative variance is not necessarily bad
 - ◆ What good is it?
- Sound and fury...





Discussion

- Issue
 - ◆ Doesn't measure time
 - ◆ Doesn't identify work
 - ◆ "+" may be bad
 - ◆ "-" may be good
- Reason
 - ◆ Measures value of work completed vs. planned on same basis (\$, hrs.)
 - ◆ Requires 'drill down' analysis
 - ◆ Work done not on critical path; offsetting variances masked
 - ◆ Float



Schedule Variance: Strengths

- Provides reliable early warning
 - ◆ When large, early and unfavorable
 - ◆ Observations on 100's of DoD contracts
- Reflects cost/schedule integration
 - ◆ Work breakdown structure
 - ◆ Performance measurement baseline

There is no cost variance but there is a large negative schedule variance





Schedule Variance: Misunderstandings

- Earned value technique was developed for cost measurement, not scheduling
 - ◆ Three basic elements
 - ◆ Planned value
 - ◆ Earned value
 - ◆ Actual cost
- } Data needed to obtain
- } ***Objective cost measurement***
- Earned value measures work accomplished
 - ◆ Better term “accomplishment variance?”
 - ◆ Must be used with other schedule information



The Time is Right for Change



- Better environment
 - ◆ Earned value redefined from reporting to management
- Better tools
 - ◆ Relational data bases
 - ◆ True cost/schedule integration - earned value & critical path
 - ◆ Timely data (weekly earned value becoming common)



Unleashing the Power

- By itself, schedule variance reveals no intelligence about critical path
 - ◆ How are cost and schedule integrated?
 - ◆ Planned value at early start creates earliest possible variance information
 - ◆ But also creates “meaningless” schedule variance
 - ◆ Later integration creates less negative variance and correspondingly less management information
 - ◆ There is no industry standard
 - ◆ DEKKER TRAKKER™ uses early start date



Unleashing the Power

- Solution
 - ◆ Take advantage of earliest practical information
 - ◆ BCWS at early start
 - ◆ A later date cannot optimize management information
 - ◆ Use data base engine capabilities
 - ◆ Integrate schedule and earned value information
 - ◆ Part of management process
 - ◆ “Report up,” not “drill down”
 - ◆ Create new schedule variance subcategories



Schedule Variance Categories

- “Problem”
 - ◆ Critical tasks that did not start early
- “Late with Float”
 - ◆ Tasks that did not start early but are not critical
- “Purposely Delayed”
 - ◆ Tasks delayed due to work-around (user flag)
- “Early”
 - ◆ Tasks begun ahead of early start
- “Anomalies/Errors” (user flag)



Schedule Variance Example

- Schedule variance $40 - 50 = (10)$

Problem - 2 *

Late with float - 6 *

Purposely delayed - 4

Early + 2 *

- 10

**tracked automatically*



Cost Variance

- Definition
 - ◆ Earned Value (BCWP) minus Actual Cost (ACWP)
- Positive (+) variance indicates underrun for work completed to date and work in process
- Negative (-) variance indicates overrun for work completed to date and work in process



Cost Variance Categories

- Similar to Schedule Variance
 - ♦ Understood & accepted
- Subcategories
 - ♦ “Positive”
 - ♦ “Negative”
 - ♦ “Anomalies/Errors”
- Avoid “washout” of lower level variances

±\$



Cost Variance Example

- Cost variance $40 - 35 = 5$

<i>Negative</i>	- 5 *
<i>Positive</i>	<u>+ 10 *</u>
	5

**tracked automatically*



Risk Management

- Better risk identification - work in process
- “Watch List”
 - ◆ Prospective analysis to identify tasks that will affect critical path if not begun on schedule
 - ◆ 30/60/90 day
 - ◆ Relate to risk management
- Management vs. reporting
 - ◆ Data base engine is key
 - ◆ Extract intelligence from data to create meaningful management outputs



Management Presentation

- Customer understanding
 - ◆ Integrated Baseline Review
 - ◆ External customers
- Customer reports
 - ◆ Categorize variances
 - ◆ Management charts
 - ◆ Lines/colors
 - ◆ Web delivery
 - ◆ Problem notification by e-mail





Cost Performance Report - CPR - Form																
CONTRACTOR: Acme Widgets LOCATION: 123 South Sunset Road Taos, New Mexico						CONTRACT TYPE/NO: C6 A7894324		PROGRAM NAME/NUMBER IMPLA904 Widget		REPORT PERIOD 07/31/1999		SIGNATURE, TITLE & DATE		FORM APPROVED OMB NUMBER 22R0200		
QUANTITY 500.00	NEGOTIATED COST \$526,954	EST COST AUTH, UNPRICED WORK \$150,000			TGT PROFIT/FEE % 11%	TGT PRICE \$1,245	ESTIMATED PRICE \$1,145	SHARE RATIO 1 : 1		CONTRACT CEILING \$600,000		EST CONTRACT CEILING \$625,000				
ITEM	CURRENT PERIOD						CUMULATIVE TO DATE						REPRO-GRAMMING ADJUSTMENTS		AT COMPLETION	
	BUDGETED COST		ACTUAL COST WORK PERFORMED	VARIANCE		BUDGETED COST		ACTUAL COST WORK PERFORMED	VARIANCE		COST VARIANCE	BUDGET	BUDGETED	LATEST REVISED ESTIMATE	VARIANCE	
	WORK SCHEDULED	WORK PERFORMED	SCHEDULE	COST	WORK SCHEDULED	WORK PERFORMED	SCHEDULE	COST								
2100 Product Development	\$33,546	\$85,234	\$16,400	\$51,688	\$68,834	\$139,264	\$139,760	\$68,300	\$496	\$71,460			\$149,600	\$78,050	\$73,550	
2110 Applications		\$1,436	\$1,200	\$1,436	\$236		\$1,436	\$7,050	\$1,436	\$-5,614				\$7,770	\$-7,770	
2120 Applications	\$63,968		\$68,850	\$-63,968	\$-68,850	\$223,022	\$103,410	\$254,390	\$-110,612	\$-150,980			\$249,200	\$450,976	\$-201,776	
2130 Technical Writing	\$12,100	\$11,675	\$12,000	\$-425	\$-325	\$17,050	\$15,950	\$16,600	\$-1,100	\$-650			\$22,000	\$22,650	\$-650	
2132 Implementation		\$741	\$400	\$741	\$341		\$741	\$2,000	\$741	\$-1,259				\$2,384	\$-2,384	
3100 Customer Support		\$463	\$800	\$463	\$-337		\$463	\$2,800	\$463	\$-2,337				\$3,040	\$-3,040	
4100 Technical Services	\$4,940	\$5,510	\$4,750	\$570	\$760	\$9,500	\$9,500	\$9,500					\$9,500	\$9,500		
4120 Data Communications		\$139	\$150	\$139	\$-11		\$139	\$600	\$139	\$-461				\$672	\$-672	
5100 Education	\$420	\$1,119	\$1,170	\$699	\$-51	\$1,680	\$2,347	\$2,705	\$687	\$-358			\$4,169	\$5,684	\$-1,515	
5120 Customer Training		\$246	\$400	\$246	\$-154		\$246	\$1,000	\$246	\$-754				\$2,502	\$-2,502	
6100 Quality Assurance		\$452	\$280	\$452	\$172		\$1,120	\$452	\$1,120	\$-668				\$1,813	\$-1,813	
6110 Systems QA		\$185	\$200	\$185	\$-15		\$185	\$800	\$185	\$-615				\$896	\$-896	
6120 Applications QA		\$185	\$200	\$185	\$-15		\$185	\$800	\$185	\$-615				\$896	\$-896	
Subtotal:	\$114,974	\$107,385	\$108,800	\$-7,588	\$685	\$390,496	\$274,814	\$367,665	\$-115,882	\$-62,851			\$434,469	\$584,833	\$-150,364	
Labor Overhead	\$5,359	\$7,747	\$6,812	\$2,388	\$935	\$25,873	\$22,037	\$42,578	\$-3,836	\$-20,541			\$28,152	\$60,089	\$-31,937	
G&A	\$8,081	\$7,931	\$7,940	\$-150	\$-9	\$27,961	\$19,022	\$30,248	\$-8,930	\$-11,226			\$31,028	\$48,119	\$-15,091	
Subtotal:	\$13,440	\$15,678	\$14,752	\$2,238	\$926	\$53,834	\$41,069	\$72,826	\$-12,796	\$-31,767			\$59,180	\$108,208	\$-47,028	

DoD Cost Performance Report



Project:	IMPLA904	CPR 5-Variance Analysis WBS 1.4 Software Develop	Run Date:	04/10/1999
Report Name:	07PRF7VAR		Run Time:	09:23
Planned By:	David Lamont		Status Date:	07/31/1999
			Form:	RES0210

Project Title Master Implementation of ABC/EVMS	Project - WBS Number 1.4
Cost Account Title 1.4	Cost Account Manager

Current Period					Cumulative-To-Date				
BCWS	BCWP	ACWP	Sched Var	Cost Var	BCWS	BCWP	ACWP	Sched Var	Cost Var
\$33,546	\$98,058	\$18,750			\$139,263	\$142,084	\$78,500	\$3,321	
								2.35%	

Thresholds						At Completion		
Current Period		Cumulative-To-Date		AT Completion		BAC	EAC	VAC
SV: + 10%	CV: + 10%	SV: + 10%	CV: + 10%	VAR: + 10%		\$149,600	\$87,714	
OR - 10%	OR - 10%	OR - 10%	OR - 10%	OR - 10%				
\$10000	\$10000	\$10000	\$10000	\$10000				

Cause

Schedule Variance Categories
 Problem
 Late with float
 Delayed



Project:	IMPLA904	CPR 5-Variance Analysis WBS 1.4 Software Develop	Run Date:	04/10/1999
Report Name:	07PRF7VAR		Run Time:	09:23
Planned By:	David Lamont		Status Date:	07/31/1999
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Thresholds						At Completion			
Current Period			Cumulative-To-Date			AT Completion	BAC	EAC	VAC
SV: + 10%	CV: + 10%	SV: + 10%	CV: + 10%	VAR: + 10%			\$149,600	\$87,714	
OR - 10%	OR - 10%	OR - 10%	OR - 10%	OR - 10%					
\$10000	\$10000	\$10000	\$10000	\$10000					

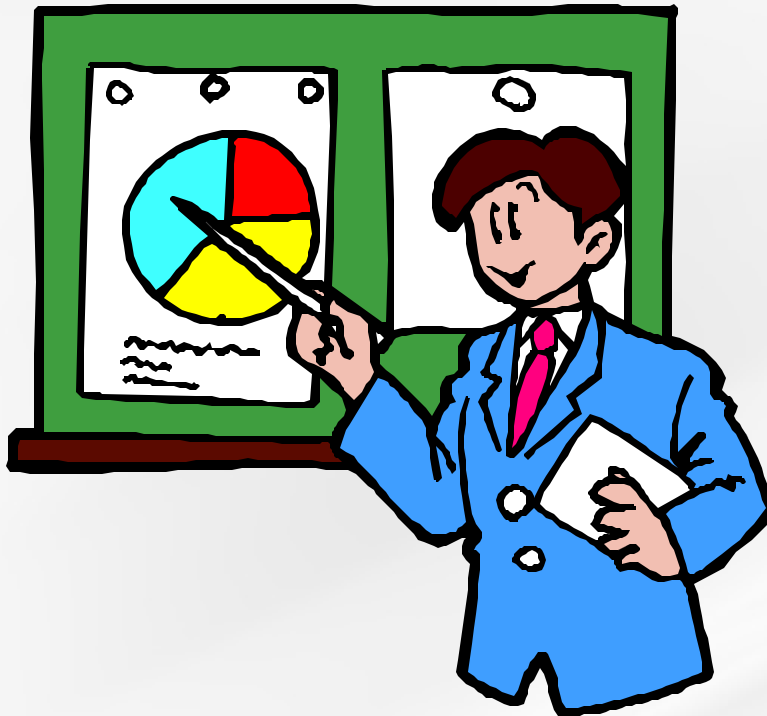
Cause

Cost Variance Categories

Positive
Negative



Management Charts



- Refine current designs
 - ◆ Cost/schedule variance trends
 - ◆ More than one schedule variance line
- New types
 - ◆ Pie chart
- Web-based presentation
- Automatic e-mail notices



Coming Attractions

- Display overtarget baselines clearly
- Display relationship between cost variance and financial status (for example, share lines)



Summary

- State of the art in cost/schedule integration
 - ◆ Made possible by state of the art software
- Better integration of earned value and risk management
- Powerful management information outputs
- Raising the bar for integrated project management tools