Contract Performance Information System

Delivery and Accessibility of Earned Value Information

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I have often thought there was a need to have a computer-based contract performance information system easily accessible to anyone within a project office or program executive office. Frequently, contract performance information is kept within a special, select group of management and the earned value specialists within a project office or support office. The people who have the greatest capacity to provide a corrective action to a contract problem—the functional staff, such as technical management, test, logistics, product assurance, and configuration management—often are not informed of, nor have access to, this contract performance information.

The management and earned value specialists need to get this type of information out to the functional staff so they know the status of the program, are aware of problems promptly, and can provide corrective actions. Program managers usually have a pool of very smart employees to work around problems. The smart program manager, instead of assuming a stoic, "bear the burden" posture, will rely upon the functional staff to develop solutions to problems when things go wrong. Contract performance measurement is simple, and the earned value specialists should strive to keep it that way. Making contract performance information very accessible and simple is in the best interests of a program.

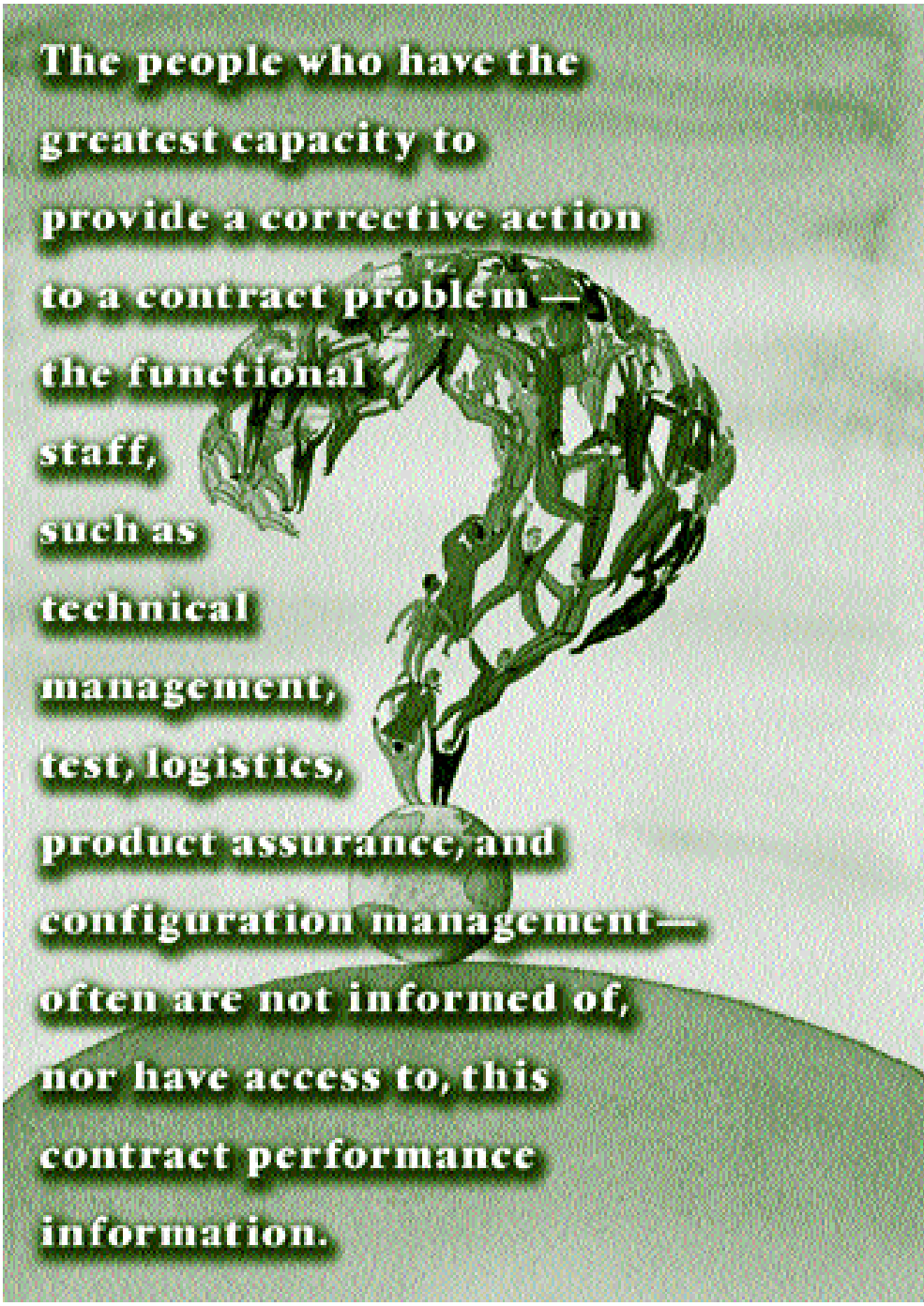

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FIGURE 1. **Example of Contract Performance Information System Database**

For Period Ending	Mar-02	Apr-02	May-02	Jun-02	Jul-02	Aug-02
BCWS	1	1,000	2,003	3,006	4,009	
BCWP	1	1,002	2,005	3,010	4,015	
ACWP	1	999	2,002	3,005	4,008	
BAC	1	88,000	88,000	88,000	88,000	
LRE	1	88,000	88,000	88,000	88,000	

Input number of months to display in charts 4

Earned value information is simple—solutions are difficult.

Contract Performance Information System

To rectify this problem, I have created a computer-based, Intranet or Internet, contract performance information system to facilitate access to, and monitoring of, performance of many contracts. This information system will have the capability of storing several contracts such that a program executive office could put all of their contracts in the database, or a project office could use it for their contracts for internal use only. My program accomplishes this goal—and it is user friendly and absolutely free. The commercially available software that I know to be capable of accomplishing this goal is very expensive, and non-power users would rarely find what they need to know.

It is not within the scope of this article to explain contract performance measurement or earned value management. Therefore, my article focuses on the delivery and accessibility of earned value information.

Database

The contracts in my database are fictional; I have named them Alpha, Bravo, and Charlie. These databases are in no way identical to any existing contracts. Figure 1 shows an example of my fictional database. I allow for inputting 25 months of data. This program could very easily be modified to add additional months, but I had no interest in what happened more than 25 months ago.

Developing the System

I used Microsoft Excel for making these charts and calculations. The inputs are general contract information with six fields for numerical input: 1) Budgeted Cost of Work Scheduled (BCWS), 2) Budgeted Cost of Work Performed (BCWP), 3) Actual Cost of Work Performed (ACWP), 4) Budget At Completion (BAC), 5) Latest Revised Estimate (LRE), and 6) Number of months to be graphically displayed.

As shown in Figure 1, the column displaying only "1" entries is prior to awarding the contract. Using entries of "1" is a space holder of sorts, and provides a practical solution to a programming problem. The blank columns are the future months. Once the user enters the number of months to be graphically displayed by putting a number to the right of "Input number of months to display in charts," the model automatically outputs graphs depicting the most recent number of months selected. The last month displayed on the charts is determined by the last month with a value in the Actual Cost of Work Performed (ACWP) row.

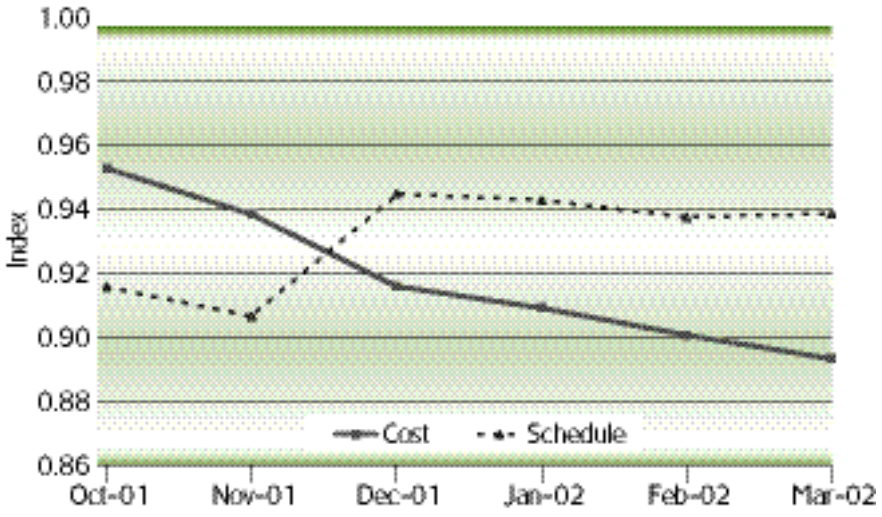
The outputs will be General Contract Information, Cost and Schedule Performance Index, and Cost and Schedule Variance, all graphically displayed for each contract.

Figure 2 shows the General Contract Information. Many values on the General Contract information are derived from

FIGURE 2. **General Contract Information**

Contract Name	Alpha Project		
Contract #	DAH001-01-C-0140		
Contractor	Big Company		
As of Date	Mar-02		
Start Date	10 October 2000		
Completion Date	30 April 2003		
Contract Type	CPIF		
Share Ratio	60% / 40%		
Fee; Min, Target, Max	5%, 7.5%, 15%		
	Cost		
	(thousands of dollars)		
BCWS	$85,129	% of Schedule	56%
BCWP	$79,919	% Complete	53%
ACWP	$89,458	% Spent	59%
CV	-$9,539		
SV	-$5,210		
CPI	0.893		
SPI	0.939		
Target Cost	$151,000		
BAC	$151,000		
Ktr LRE	$151,000		
Govt EAC	$169,023		
PMO	Alpha PO		
PM	COL One	313-0001	
DPM	LTC Two	313-0002	

FIGURE 3. **Cost and Schedule Performance Index**



automatically taking values off of, or calculated from, values on the input data sheet. This includes % of Schedule, % Complete, % Spent, CV, SV, SPI, CPI, and EAC.

Figure 3 shows Cost and Schedule Performance Index. Cost Performance Index is a measure of cost efficiency comparing the value of work accomplished for a dollar of cost. Schedule Performance Index is a measure of schedule efficiency comparing the value of work accomplished to the value of the work scheduled. I think of Performance Index as showing the degree of a problem, while Variance shows the magnitude of the problem.

Figure 4 shows Cost and Schedule Variance. Cost Variance is the difference between the value of work accomplished and the actual cost. Schedule variance is the difference between the value of work accomplished and the value of the work scheduled to that point in time. Variance shows the magnitude of a problem in dollars.

To automatically show the most recent number of months in the charts, I used the Microsoft Excel functions CountA and Offset.

The syntax for CountA is CountA (range). Microsoft writes, "CountA counts the number of cells that are not empty and the values within the list of arguments. Use COUNTA to count the number of cells that contain data in a range or array." I used CountA to count the number of columns; columns correspond to months that contain data. CountA is used to find the column that has the latest, most recent month of data.

The syntax for Offset is OFFSET(reference cell, range begins number of rows up or down, range begins number of columns left or right, range height, range width). Microsoft writes "OFFSET Returns a reference to a range that is a specified number of rows and columns from a cell or range of cells. The reference that is returned can be a single cell or a range of cells. You can specify the number of rows and the number of columns to be returned."

The definition of Offset gave me a headache. In this case Offset finds the data set for the months to be charted, for example, the most recent 6, 12, or 18 months. The "range width," or "range is columns wide" argument is the number of months to display in the graphs. The range width is a negative number, which effectively says from the latest month go back the specified number of months, for example, 6, 12, or 18 months.

I then created Excel named ranges, such as Months, CPI, SPI, CV, and SV, which are the input data sets for the Cost and Schedule Performance Index chart, and the Cost and Schedule Variance charts. The formula for the range named CPI (Cost Performance Index) is shown in Figure 5. The Schedule Performance Index range is named SPI; the Cost Variance and Schedule Variance have range names of CV and SV, and they are very similar to CPI (Figure 5).

I had difficulty programming these functions and integrating these with Excel charting software. Descriptions of these functions are confusing. I read books and articles about setting up charts using this method, but I found that experimenting with Excel functions more readily led to workable solutions. (Users who find that Excel charting software just does not suit their needs may want to use a different charting software.)

I also used Excel to create the graphs and General Contract Information. To

FIGURE 4. **Cost and Schedule Variance**

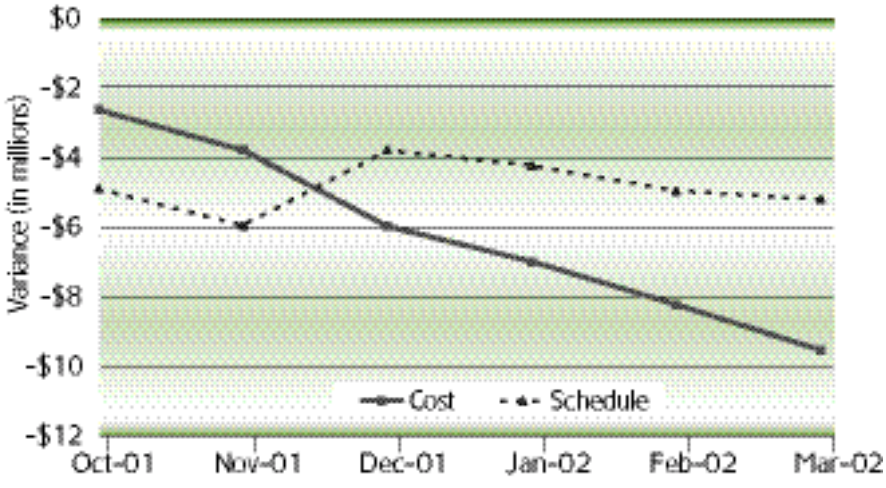


FIGURE 5. **Range Names**

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CPI=OFFSET(reference cell, range begins rows away, range begins columns away, range is rows tall, range is columns wide)

CPI=OFFSET('Alpha data'!$B$12,0,COUNTA('Alpha data'!$B$6:$AY$6)-1,1,-'Alpha data'!$M$48)
```

configure these files for uploading to the Internet or Intranet, I used Excel FILE, SAVE AS WEB PAGE to save it as a HTM files. The files names are Alpha Project.htm, Bravo Project.htm, and Charlie Project.htm. I used WS_FTP freeware software to upload the HTM files onto my Web site at http://amarkell.home.mindspring.com.

One Contract in One Minute

A major goal of mine was to make this system extremely easy to use and update, and I believe I accomplished that goal. With my contract performance information system, a user could conceivably perform a monthly update of one contract in one minute. Just about anyone can fit that into his or her schedule.

The input data fields are colored red. If you input data where the print is black, you made a mistake. I keep a set of charts updated for one contract at the second level Work Breakdown Schedule, and I find that it saves me time rather than costing me time. If called upon, I can produce a variance or index graph very rapidly.

Potential Improvements

A very obvious improvement would be to add a variance analysis and a corrective action plan. They are very important, but they are usually influenced by management's tendency to present problems in the best light and long-time delays. Knowing about a problem sooner, however, is better than waiting for a variance analysis and corrective action plan.

How to Get a Copy of the Program

My program could easily be modified to adapt to your contract. Again, the Web site for my fictional Alpha, Beta, and Charlie contracts output is **http://amarkell.home.mindspring.com** and the file names are Alpha Project.htm, Bravo Project.htm, and Charlie Project.htm. I hope some readers of this article are motivated to use my program to show their contract performance information.

Anyone that would like a copy of my program can e-mail me a request at **amarkell@mindspring.com**.

USDA Graduate School Honors DAU as Runner-up for W. Edwards Deming Award

On Sept. 12, during a ceremony held at the U.S. Department of Agriculture (USDA) Graduate School Annual Faculty Reception, the USDA Graduate School presented the W. Edwards Deming Outstanding Training Award to the Air Force Audit Agency. USDA also honored the Defense Acquisition University, Maintenance and Logistics Command Atlantic, and Department of Energy Idaho Operations Office with the Training Recognition Award as runners-up for the 2002 W. Edwards Deming Outstanding Award. Presented annually, the award honors a Federal Government civilian organization or branch of the military that has successfully completed an innovative employee development and training program.

The Deming Award honors Dr. W. Edwards Deming and recognizes his 22-year career with the Graduate School as a mathematics and statistics faculty member and curriculum chair. Deming, known as the father of the Japanese post-war industrial revival, was regarded by many as a cutting-edge quality guru. Before his death in 1993, he authored hundreds of papers and published *The New Economics*, a synthesis of his ideas on quality and leadership.

USDA Graduate School Training Recognition Award—presented to DAU during the USDA Graduate School Annual Faculty Reception, Sept. 12, 2002. Pictured from left: Christopher St.John, DAU Advanced Distributed Learning; Frank J. Anderson Jr., DAU President; and Dr. Jerry Ice, Executive Director, Graduate School, USDA.

Photo by Army Sgt. Kevin Moses