

# COST/SCHEDULE PLANNING CONTROL SPECIFICATION

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In June 1966 the Air Force Systems Command (AFSC) issued its *Cost/Schedule Planning and Control Specification (C/SPCS)* (11:115)\* The specification established a requirement that a contractor's internal cost/schedule planning and control system meet certain basic minimum criteria and that contractor reports to the Air Force be derived from the same system used by the contractor for his internal planning and control.

The purpose of this article is to explain the *Cost/Schedule Planning Control Specification* contained in **AFSC Manual 70-5**, dated June 1966.

## Background

During the past two decades the complexities and uncertainties of weapon systems development and acquisition have increased significantly. In developing and producing these new systems there has been a shift from government laboratories and arsenals to private corporations. Though the location of the work has been changed, DoD still retains the basic responsibilities for obtaining weapons of high performance and quality, on time and at an acceptable cost. To meet these responsibilities it is necessary that valid information flow from contractors to government managers.

One important management area—the contractor's planning and control of costs and schedules—has long been a problem in government-industry interface efforts. The contractors have had their own systems for planning and controlling costs and schedules; however, the output from these systems have not met government's needs. (6:65-73) This has led to a host of government-imposed management systems at contractor locations. To satisfy the various requirements, contractors have developed redundant reporting systems—one for internal management and others to satisfy government requirements. (7:14)

\* The numbers in parentheses refer to the Bibliography on page . The first number indicates the source and the second number indicates the pages.

The problem area was recognized partly in May 1962, at the AFSC Industry Conference held in Monterey, California; one of the major agenda projects was, "uniform information for industry and government". The objective of this project was to have industry review its internal data with the aim of achieving like data for both management and Air Force use. (10:42) Regardless of these early efforts, as late as May 1966 the Aerospace Industries Association (AIA) commented that one of the most urgent problems facing defense industry was the "increasing proliferation of divergent and incompatible management systems." (1:3) The AIA concluded that, because of the complexities created by the sheer number of systems, their full benefit was not being realized.

## The Cost/Schedule Planning Control Specification

The C/SPCS as published in 1966 was to be included in all RDT&E programs estimated in excess of \$25 million or production investments exceeding \$100 million. The specification stated that it did not represent a requirement for a separate or an additional control or reporting system. It recognized that a contractor's internal cost planning and control system served other purposes than status reporting to the government and ". . . the Air Force should not concern itself with identification of the specific forms of basic input data to the contractor's internal system." (11:113) The specification requires that the contractor's system be capable of providing to the procuring authority financial and schedule information monthly. Specific reporting that may be contractually required would be at a summary level only; the Air Force would not ask for cost and schedule information below the summary level except in those situations where a problem was indicated. The AFSC specifications also provided for an in-plant validation of the system by DoD personnel. (11:113-123)

Before analyzing the minimum capabilities required by the contractor's cost planning and control system, it is necessary to understand the implications of a sentence which is



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repeated in three separate paragraphs of the introductory section of the specification. Paragraph 3.0 provides that:

*The cost/schedule planning and control methods implemented by the contractor must result in a single, formal, integrated system that will serve both the contractor's internal management requirements and the requirements of the Air Force for cost information . . . (11:116)*

There are three important concepts in the sentence, namely that the contractor must operate a *single*, a *formal*, and an *integrated* system. The concept of a *single system* means that one system must be used to fulfill all requirements—both within the company and for the government. It will no longer be possible to provide company management with one set of reports and then “sanitize” the information before it is submitted to the Systems Program Office. (SPO)

The requirement for a single system also means that a SPO cannot require a contractor to operate a “special” system for a specific program.

The requirement for a *formal system* means that the contractor's system must be documented. All pertinent items must be covered in written procedures and be available to the operating personnel. In fact, it is a contractual requirement that the system be implemented and used.

Finally, an integrated system means that the structure of scheduling, budgeting, work definition and cost accumulation systems must coincide at the cost account level. Cost and schedule planning are combined providing a basis for measuring cost performance in relation to the work accomplished and “actual” cost incurred.

### Structure of the System

For a system to be considered acceptable, it is expected to provide a framework within which responsibility for specific work is assigned, and detailed cost, schedule and related technical information is summarized for successive management levels. The system must provide for the assignment of realistic cost estimates to correspond to the work breakdown and responsibility assignments, and for the accurate accumulation of the related actual costs as the work progresses. The system must provide the means for comparing the actual costs incurred with the estimated costs for specific work accomplished, including estimated costs of work in process. Finally, the system must provide the capability for analyzing the available information and identifying cost problem areas in sufficient time to take effective management action. (2: 11: 117)

Starting with the contract itself, the work is successively divided, based on an integrated *work breakdown structure* (WBS); the upper levels of the WBS are provided by the government (levels above contractor's system in the diagram on page 16) and constitute the structure for summary reporting to higher levels of management and government. The cost accounts and work packages are devised by the contractor to fit his operation. (3:38)

The lowest level of the WBS is the work package. The work package must be directly associated with or supported by work plans or orders. The work package should be for a

short time span, and have beginning and ending points clearly defined in terms of accomplishment rather than calendar dates. Further, the package should be the responsibility of a single organizational unit. Finally, a value will be assigned to the package in terms of dollars or man-hours so that the actual work accomplished can be measured against the planned value of the work accomplished within a cost account.

As can be seen, the work package is a detailed task or job assignment. The value assigned to it should reflect a cost estimate of the work content and *not an allocation of a higher level budget*. Since a work package is a current detailed task, it may not be practical to plan for any great length into the future.

Each cost account must be planned and controlled through the use of either work packages or time-phased budgets (level-of-effort)\* but not a combination of both. All actual costs incurred under a contract must be collected through the cost accounts, and budgets must be assigned to all cost accounts so comparisons of actual and budgeted cost elements can be made.

A final proviso of the required integrated WBS is that the sum of the work package budgets must equal the budget for the controlling cost account; the sum of the cost account budgets must equal the budget for the reporting structure item; and the sum of the reporting structure item budgets plus management reserves (if any) must equal the contract total. The specification recognizes that there may be management reserves (undistributed budgets) held back by management, and requires that these reserves be accounted for in separate summary accounts. (11:119)

Another requirement of the specification is that the contractor's system of planning and control of schedules must be integrated with the system for planning and control of costs discussed above. The system for planning and control of schedules must provide the capability for relating actual status of the functional efforts of the contract to planned objectives, and for identifying those WBS elements which are behind schedule in a timely manner to allow corrective action.

In essence, the C/SPCS combines the classical budgeting and scheduling systems into one integrated system. This system then provides the basis for measuring cost performance in relation to the accomplishment plan.

### Measuring Techniques

The technique used to measure whether the work is on schedule and within budget is merely a comparison of the planned value of work scheduled (PVWS), the planned value of work accomplished (PVWA), and the actual costs incurred for the cost account. The PVWS is obtained when the work package budgets and the time schedules are integrated. Since the work packages are tasks to be performed over a short period of time, the scheduled completion of these packages should normally be within one or two accounting periods.

To determine the PVWA at any point in time, it is necessary to summarize the value of the completed work packages, determine the value of the in-process work packages  
(Continued on next page)

\* Examples of level-of-effort activities include sustaining engineering and certain planning and scheduling activities.



# C/SPCS . . .

(Continued)

and determine the to-date value of level-of-effort work packages. The actual costs incurred are collected within the cost accounts.

By integrating cost and schedule planning a complete picture can be obtained from one report. Prior systems that used separate budget and schedule systems provided for comparisons between budgeted costs and actual costs, and between planned and actual schedules. However, a true picture in terms of cost and schedule could not be obtained without undue work.

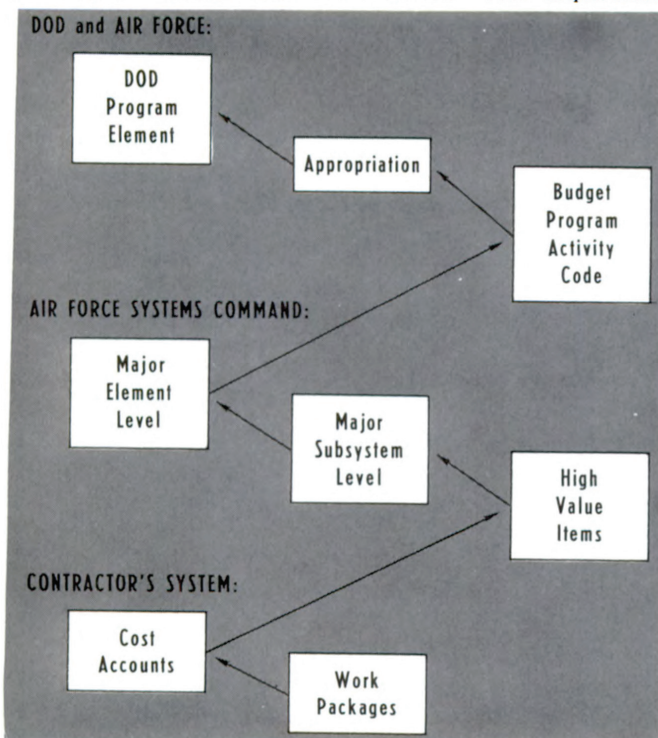
One further improved technique provided by the integrated **WBS** is the method of estimating cost at completion of the effort. Rather than just subtracting actual costs from total contract target cost, as had been the practice in many instances, this new method uses integrated cost and schedule information as follows:

$$\frac{\text{Actual Cost}}{\text{PVWA}} \times \text{Contract Target Cost} = \text{Estimated Cost at Completion}$$

Though any mathematical formula used for forecasting must be tempered with judgment, this formula gives some weight to current status. If a forecast differed significantly from the estimate provided by this formula, any manager would have reason to ask for clarifications.

## Analysis of Variance

The **C/SPCS** requires that the work package and cost account budgets be estimated by element of cost on the same basis as the actual costs are collected. This requirement



facilitates analysis of variances and will permit timely problem identification.

It is possible through cost accounting techniques to perform variance analyses and determine how much of the individual variances is attributable to the variance in labor hours and direct materials, and how much is attributable to rate changes—both labor rates and labor burden rates.

During the performance of the development and/or production contract, the contractor will demonstrate to government personnel that he is operating the **C/SPCS** described in his contract. The demonstration will be made to a designated team and will be the basis for the government's acceptance of the system.

Within the Air Force, the primary responsibility for conducting the review rests with the Comptroller, AFSC. The teams are normally headed by a representative of the AFSC Comptroller's Office, with team members from the applicable **SPO**, Air Force Plant Representative Office (**AFPRO**) or Defense Contract Administration Services Office (**DCASO**), the Defense Contract Audit Agency (**DCAA**) and other AFSC specialists as needed.

At the conclusion of the review the team issues a report of their findings. Requirements not met by the contractor's system are noted and brought to the contractor's attention for necessary corrections. When the changes have been made and the government is satisfied that all requirements have been met, the contractor's system will be validated.

## Summary

The government manager who is charged with the responsibility for obtaining weapons of high quality, on time and at a reasonable cost needs timely, accurate and meaningful information regarding performance under defense contracts. The **C/SPCS** is an attempt by the Air Force to improve the validity of information from contractors to the government manager by requiring the same system used for the contractor's internal management be used for reporting to the government.

As contractors' management systems are found to meet **C/SPCS** criteria, and are utilized for internal management and reporting to the government, the Air Force will be assured of more valid data and will be able to monitor the program without the close surveillance now required. Such an environment will require mutual understanding and should bring us a lot closer to an acceptable government-industry management relationship.

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